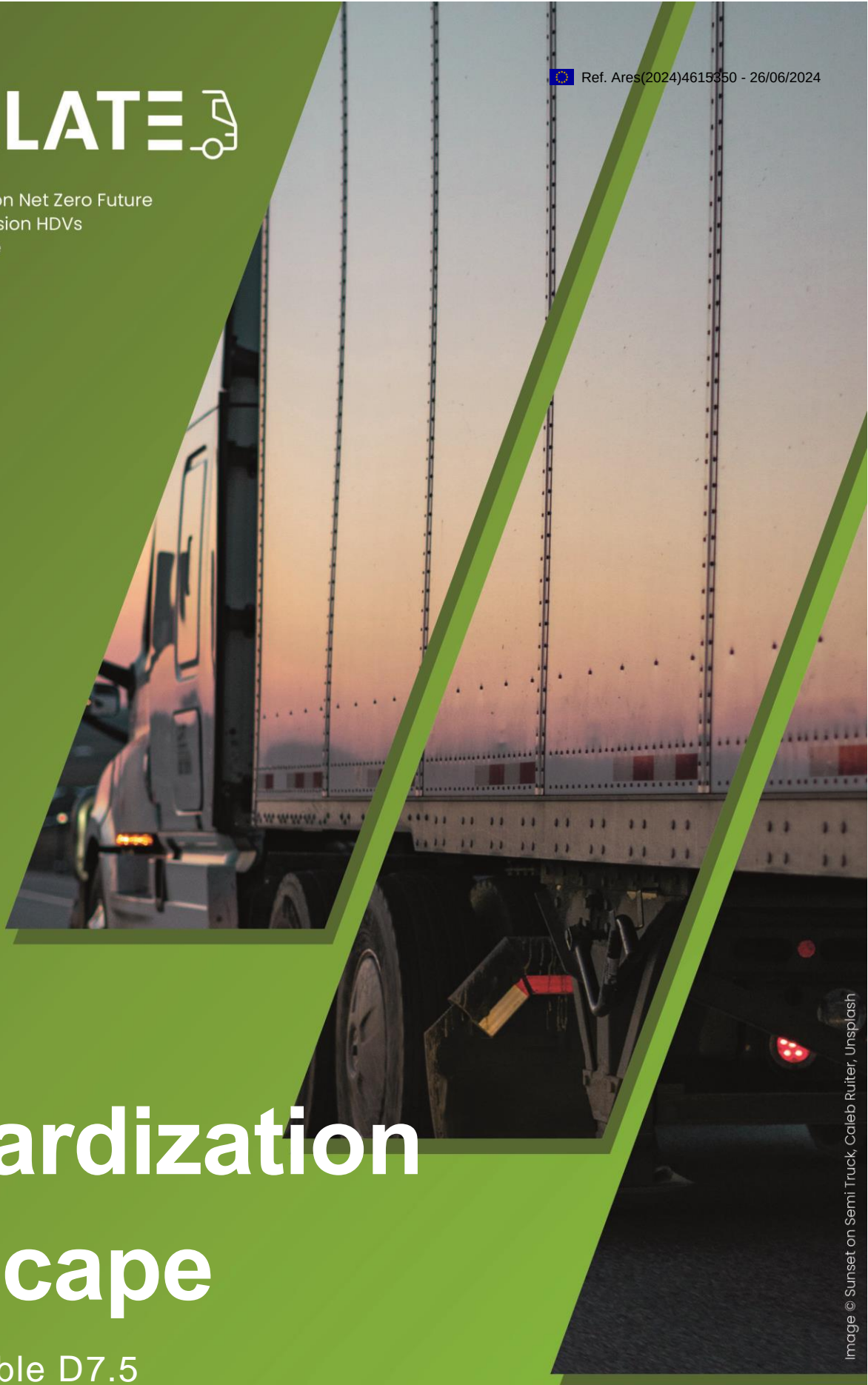


# ESCALATE

Powering European Union Net Zero Future  
by Escalating Zero Emission HDVs  
and Logistic Intelligence



# Standardization Landscape

Project deliverable D7.5

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This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101096598.

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## Deliverable Administrative Information

Deliverable Administration					
Grant Agreement	101096598	Project short name	ESCALATE		
Deliverable no.	D7.5	Name	Standardization Landscape		
Status	Draft	Due	M12	Date	15/12/2023
Author(s)	MARCUS LETZ (DIN), DR. CHRISTIAN GORONCY (DIN)				
Related tasks	T7.5				
Dissemination level	PU = Public				
Document history	Version	Date	Submitted	Reviewed	Comments
	V1.0	01/11/2023	MARCUS LETZ (DIN)	INEGI, AUTH, DLR	Frist draft
	V2.0	24/11/2023	MARCUS LETZ (DIN)	USR	Second draft
	V3.0	15/12/2023	MARCUS LETZ (DIN)	AHU ECE HARTAVI KARCI (USR), SERVAIS OUENOU GAMO (FEV-FR)	Final Draft

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## Project Executive Summary

ESCALATE, an EU funded Research and Innovation project, has been awarded funding under the HORIZON-CL5-2022-D5-01 call, highlighting its significance within the academic and scientific community. The primary objective of ESCALATE is to showcase and demonstrate the efficacy of high-efficiency zero-emission heavy-duty vehicle (z-HDV) powertrains, with a targeted increase of up to 10% in their overall efficiency. Specifically tailored for long-haul applications, these powertrains are designed to provide an impressive range of 750+ kilometres without the need for refuelling or recharging, while simultaneously ensuring consistent performance during daily operations over a period of six months or more under real-world conditions. To achieve these ambitious goals, ESCALATE focuses on the development of meticulously designed modular building blocks, which are intended to attain a Technology Readiness Level of 7 or 8. These modular components will serve as the foundation for three distinct types of z-HDVs, namely battery-HDV (b-HDV), fuel-cell-HDV (f-HDV), and range extender-HDV (r-HDV). The utilization of innovative business model innovations will be instrumental in optimizing the integration and utilization of these standardised and modular building blocks, further enhancing their efficiency and effectiveness. Moreover, the ESCALATE project aims to contribute valuable insights to the scientific community through the production of three comprehensive white papers. These papers will delve into various aspects of z-HDV technology, with one particular white paper focusing on defining a clear pathway to reduce well-to-wheel greenhouse gas emissions specifically from heavy-duty vehicles. The formulation of this pathway will be informed by rigorous analysis, utilizing both empirical results and policy assessments, thereby establishing a robust foundation for future efforts in reducing the environmental impact of HDVs. Through its multifaceted approach, ESCALATE strives to advance the knowledge and understanding of high-efficiency z-HDV powertrains, foster technological innovation, and contribute to the ongoing efforts of EU aimed at achieving sustainable and environmentally friendly transportation systems.

## ESCALATE partners

List of participating countries:

-  Belgium
-  Denmark
-  Germany
-  Spain
-  Estonia
-  France
-  Finland
-  Greece
-  Poland

-  Portugal
-  Austria
-  Turkey
-  UK



## List of partners:

- FEV Europe Gmbh & FEV France (FEV)  
- Project Coordinator
- University of Surrey (USR)  
- Technical Coordinator
- Mercedes-Benz Turk As (MBT)
- Brussels Research and Innovation Center for Green Technologies (BRING)
- Teknologian Tutkimuskeskus Vtt Oy (VTT)
- Virtual Vehicle Research Gmbh (VIV)
- Aristotelio Aristotle University of Thessaloniki (AUTH)
- Polis - Promotion of Operational Links with Integrated Services, Association Internationale (POLIS)
- INEGI - Instituto de Ciencia e Inovacao em Engenharia Mecanica e Engenharia Industrial (INEGI)
- Deutsches Zentrum Fur Luft - Und Raumfahrt Ev (DLR)
- Rheinisch-Westfaelische Technische Hochschule Aachen (RWTH)
- BMC Otomotiv Sanayi Ve Ticaret Anonim Sirketi (BMC)
- Engie Energie Services (ENGIE)
- Commissariat A L Energie Atomique Et Aux Energies Alternatives (CEA)
- FEV TR Otomotiv Ve Enerji Arastirma ve Muhendislik Limited Sirketi (FEV TR)
- Ai4sec Ou (AI4SEC)
- Ballard Power Systems Europe As (BLRD)
- Kempower Oy (KEM)
- Hydrogen Europe (HEU)
- Ergtech Spolka Z Ograniczona Odpowiedzialnoscia (ERG)
- Pbx Gmbh (PBX)
- Primafrio Corporacion, S.A. (PRMF)
- Bsa Inno & Tech Gmbh (BSA)
- Oy Sisu Auto Ab (SISU)
- Valmet Automotive Ev Power Oy (VAL)
- Ortem Elektronik As (ORTEM)
- DHL Lojistik Hizmetleri As (DHL)
- Deutsches Institut für Normung e. V. (DIN)
- Kuljetus Ja Muutto O. Jylha Oy (TRJ)
- Oy M Rauanheimo Ab (RHM)
- TEKFEN Muhendislik As (TEK)
- FORD Otomotiv Sanayi Anonim Sirketi (FORD)
- Coventry University (CU)
- Electra Commercial Vehicles Limited (ELECT)
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- Reliability And Safety Technical Center (RSTER)
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## 1 Deliverable executive summary

The present deliverable D7.5 provides an overview of the first results of Task 7.5 – Standardization activities, which goes on for the entire duration of the project. This document provides a general summary of the basic knowledge on standardization in order to bring the consortium on a uniform level in this respect. Nevertheless, the focus of this deliverable is on the standardization landscape, which is relevant to the ESCALATE project and therefore also other related initiatives.

In a first step, the methodology of the standards research conducted is described. With essential keywords provided by the consortium and pre-defined areas, a search for standards with a strong link to ESCALATE was conducted. Mainly international and European standards were included in the standards overview and shared with the project partners in form of a dashboard, developed for ESCALATE standardization landscape analysis. Besides providing a summary on relevant aspects regarding project related standards, the dashboard allows the consortium members to search for specific standards by using keywords. Altogether 624 standards were included in this overview.

The dashboard was also used within this deliverable to provide an overview of the standardization landscape related to ESCALATE. The different technical committees on international and European level, which are responsible for the development of the standards are described. For particularly relevant topic areas related to ESCALATE, possible relevant standards and technical committees (TC) on European and international level are described.

All this information about standardization, standards, and TCs related to ESCALATE is supposed to raise awareness within the ESCALATE consortium of the opportunities that standardization can provide for R&I projects. This is the essential basis to develop a standardization strategy for ESCALATE and to later implement corresponding standardization activities.



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## 2 List of abbreviations and acronyms

Acronym	Meaning
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Material
b-HDV	Battery Electric Heavy-Duty Vehicle
BSI	British Standards Institution, Federal Office for Information Security
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization
CWA	CEN Workshop Agreement
DIN	German Institute for Standardization
DKE	German Commission for Electrotechnical, Electronic, and Information Technologies of DIN and VDE
EES	Electrical Energy Storage
EN standard	European standard
EU	European Union
f-HDV	Fuel Cell Heavy-Duty Vehicle
HDV	Heavy Duty Vehicle
ICS	International Classification for Standards
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
ISO	International Organization for Standardization
ITU	International Telecommunication Union
IWA	International Workshop Agreement
JTC	Joint Technical Committee
NSB	National Standardization Body

<b>r-HDV</b>	Range Extender Heavy-Duty Vehicle
<b>R&amp;I</b>	Research and Innovation
<b>SC</b>	Subcommittee
<b>SDO</b>	Standards Developing Organization
<b>TC</b>	Technical Committee
<b>TR</b>	Technical Report
<b>TS</b>	Technical Specification
<b>UNE</b>	Spanish Association for Standardization
<b>WP</b>	Work Package
<b>z-HDV</b>	Zero Emission Heavy-Duty Vehicle



### 3 Introduction

Standardization<sup>1</sup> is of great importance both at national and European level. On the one hand, international and European standards act as a common language that trading partners use on the global market. This promotes international trade and reduces costs in all areas of the economy. On the other hand, standardization promotes innovation by helping to establish it on the market in the long term. In this way, SMEs and even research projects like ESCALATE also take part in shaping the markets of the future. It can be crucial for market success to incorporate aspects of an innovation into standardization in order to prepare the market for it. For example, the creation of European standards can make it easier to export new products and ensure compatibility with existing systems [1]. Although European standardization activities are in the foreground of the EU-funded research project ESCALATE, international and relevant national standardization is presented, as a transnational harmonization of standardization documents is considered highly relevant and is the basis for the common economic area in the European Union.

ESCALATE is about the electrification of the freight transport and heavy-duty vehicles (HDV's). Thus, it is essential to ensure the applicability, trust, and conformity of ESCALATE solutions. Therefore, it is a necessity that ESCALATE's solutions are compliant with standards, technical specifications, and procedures. This is a crucial aspect to guarantee that the developed solution is working properly, and the project results are trustworthy. For this reason, ESCALATE has integrated standardization as an essential element of the project. Regarding the work structure of ESCALATE, standardization is integrated in one work package, namely WP7 – *Life Cycle Assessments, Business Models and Impact Assessments*, in Task 7.5 – *Standardization activities*. The objective of this task is to create a well-grounded overview of the current standards and standardization documents as well as relevant technical committees on national, European, and international level related to ESCALATE. This will provide an overview of the state of the art of the standardization landscape that is relevant for ESCALATE and thus ensure the compliance of the project's results with what is already on the market. The knowledge about existing standards is of importance for the ESCALATE consortium to align its products, processes, services, and solutions with the current state of the art. The identification of relevant technical committees is the basis for the direct transfer of ESCALATE results into ongoing standardization activities.

In general, this standardization overview serves as the basis for further standardization activities in ESCALATE. Knowing about existing standardization documents makes it possible to build on existing knowledge and avoid unnecessary duplication of work. Additionally, existing gaps in standardization can be better identified and impulses for new standardization activities can be developed. However, the identification of standardization needs and gaps is not part of this deliverable. These will be part of further steps within task 7.5, for which e.g., a standardization workshop will be held as one of the next steps.

In contrast to patents, knowledge about standardization is less pronounced, especially in the area of research and innovation. For this reason, the basic principles of standardization are presented in this report (see section 4) as well as the different facets of standardization at international (subsection 4.2.3), European (subsection 4.2.2), and national level (subsection 4.2.1). Subsequently, the various types of standardization documents (subsection 4.3), the function of standardization in the context of research projects (subsection 4.4), and the processes for creating standards (see subsection 4.3.2) and specifications (subsection 4.3.3) are presented in more detail. The results of the standardization research for ESCALATE are presented by explaining the approach to the standards research and finally by giving an overview of the related standardization landscape (section 5). Besides a general overview of the standardization landscape of

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<sup>1</sup> Standardization covers all types of standardization documents and is used here in general manner.

ESCALATE (see subsection 5.1), the relevant international (subsection 5.2) and European (subsection 5.3) activities are examined.



## 4 Basics of standardization

### 4.1 General

In general, a standard is a consensus-based document that is approved by a recognized body or organization, reflecting the state of the art. It should be based on the consolidated results of science, technology, and experience, and aim to promote optimal community benefits [2].

Standardization is used to agree on terminologies, methodologies, requirements, characteristics, etc. in specific areas to make a product, process, or service fit for its purpose. Thus, standardization can drive innovative outcomes by agreeing on common product requirements such as interoperability, quality or safety, and provide guidelines for achieving them. Standardization supports the development of a generic language, which is understandable for everyone and thus helps to create a common basis. The result of the standardization process is a document, which provides rules, guidelines or characteristics for activities or their results.

### 4.2 Standards developing organizations

An essential aspect of standardization is to ensure that standardization documents do not contradict each other, especially since European and international standardization have gained significant importance. This is reflected in DIN's statistics, which show that European and international standards account for 90 % of all standardization projects nowadays. The following sections give a brief description of the framework of formal standardization on international, European, and national level. Figure 1 provides an general overview of the different types and levels of standardization.



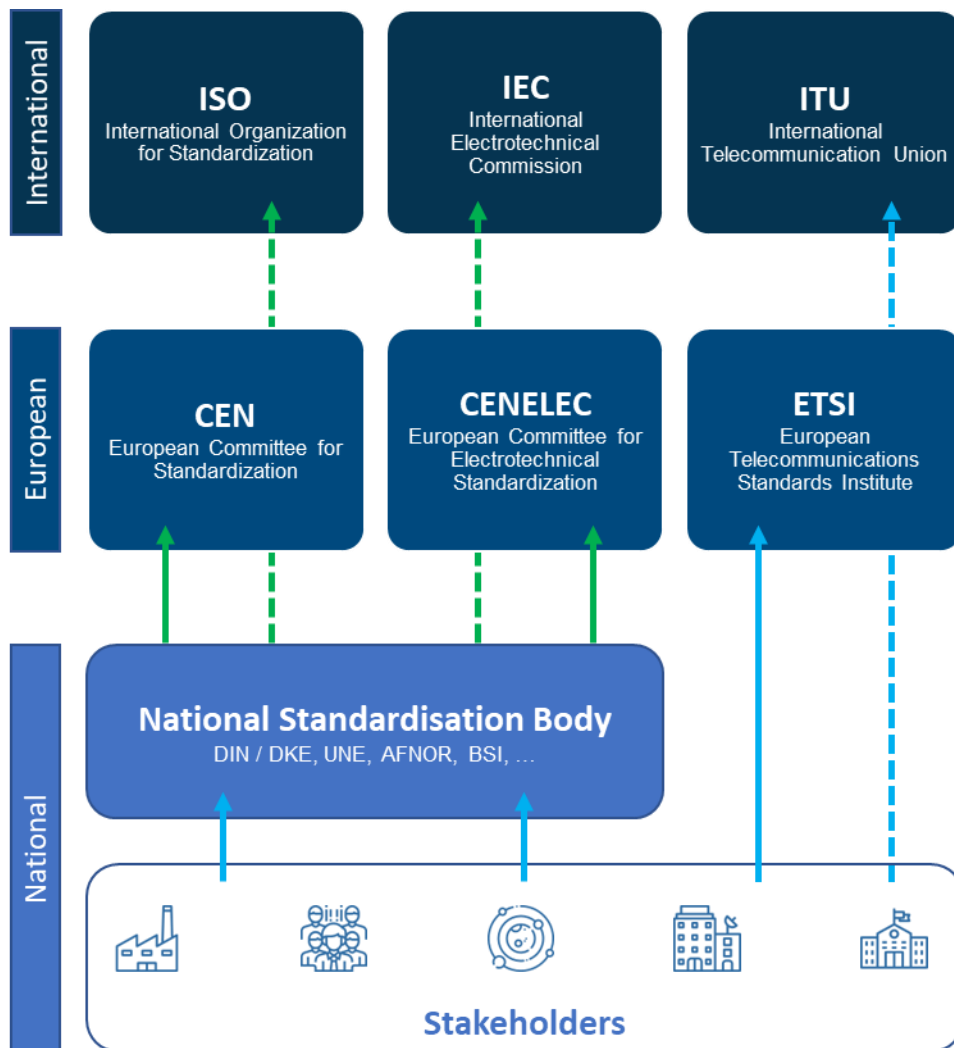


Figure 1: Overview of the organizational structure of the standardization world

#### 4.2.1 National standardization

On national level, there are different structures and standardization bodies in different countries, as e. g. German Institute for Standardization (DIN), German Commission for Electrotechnical, Electronic, and Information Technologies (DKE), Spanish standardization body (UNE), the French Standardization Association (AFNOR) and the British Standards Institute (BSI). In general, each country has one or more recognized national standardization bodies (NSB). Within the NSB’s experts from different stakeholders, e. g. from organizations belonging to industry, commerce, the public sector, or research, are developing national standards. These NSB’s are also responsible for keeping the national standardization repository updated.

To represent national positions at European or international level, so-called mirror-committees are set up and coordinated by the NSB’s. In these national committees, the work and existing results of corresponding European and international standardization committees are discussed, a national opinion is developed, and the final drafts of standards are agreed upon. When European or international draft standards are published for comment, the mirror committees also vote on whether the standard should be published or not.

Here it is important to mention, that experts working on European or international level need to be members of the national mirror committee and must be delegated by these committees.

#### 4.2.2 European standardization

The main goal of European standardization is the development of European standards, that are valid and accepted within the EU. These European standards are the basis for the European single market. The European standardization organizations CEN [3] (European Committee for Standardization), CENELEC [4] (European Committee for Electrotechnical Standardization), and ETSI [5] (European Telecommunications Standards Institute) are responsible for the organization of European standardization work. CEN is responsible for all non-electronic activities and CENELEC for electrotechnical standardization activities, while ETSI is responsible for the standardization activities in the field of telecommunication at European level.

There is a particularly close cooperation between CEN and CENELEC, which are made up of national standardization organizations from the EU and EFTA (European Free Trade Association) member states, as well as states seeking membership. In contrast, the members of ETSI are directly European companies, institutes, and organizations.

The so-called delegation principle applies to CEN and CENELEC. This means, that the mirror committees of the national standardization bodies of their member states, send national experts to the technical committees and workings groups at CEN or CENELEC to develop European standards. The European standard (EN) will only be published, when a sufficiently large majority of the national standardization organizations has approved the final draft.

European standards (EN) must automatically be adopted by member states of the EU and opposing national standards must be withdrawn. As a result of this mandatory adoption, the EN standards e.g., in Germany then become DIN EN standards (e.g., DIN EN 16575). This procedure is the same in all EU member states and Turkey largely follows this approach due to its efforts to become a member of the EU. There are situations in which it is possible to complement EN standards with additional national standards, for instance to set more detailed requirements to meet specific needs of the member state.

European specifications are referred to as CEN Workshop Agreement (CWA) as well as CEN Technical Specification (TS) or CENELEC TS, depending on the type of development and their adoption by the member states is voluntary (e.g., DIN CEN/TS 17045), unlike the adoption of European Standards.

#### 4.2.3 International standardization

The international standardization organizations ISO [6] (International Organization for Standardization), IEC [7] (International Electrotechnical Commission), and ITU [8] (International Telecommunication Union) are responsible for the organization of international standardization work. ISO is responsible for all non-electronic and IEC for electrotechnical standardization activities, while the ITU is in charge of standardization activities in the field of telecommunications.

ISO and IEC are made up of the national standardization organizations, with e.g., DIN and DKE representing German interests on an international level. The ITU, on the other hand, is a special unit of the United Nations, whose 191 member states develop recommendations together with companies from the private sector and other regional and national organizations. Only when they are adopted by normative organizations such as ISO, ANSI (USA) or ETSI as well as by national regulatory authorities, such as the Federal Network Agency in Germany, they acquire the character of standards.

The so-called delegation principle also applies to ISO and IEC, meaning that the national standardization organizations send their experts to the working groups and technical committees of the international standardization bodies. An international standard (ISO) is only accepted, when a sufficiently large majority of the national standardization organizations has voted for its draft. International specifications are called IWA as well as ISO TS or IEC TS, depending on the type of development.

In contrast to European standardization, there is no obligation to adopt international standards in national standards. However, since internationally applicable standards are relevant for international trade or for global stakeholders, conflicting national or European standards should be avoided. There is the possibility of transferring international standards in European and national standards. The resulting documents have the characteristics and names listed in Table 1, depending on the background. There are also parallel processes for developing standards at international and European level. It is possible to directly develop EN ISO or EN IEC standards without first developing the standard on international level and then adopting it at European level.

Table 1: Names of international standards depending on their adoption level.

Name	Description
ISO XXXXX	International standard adopted on neither national nor European level
DIN ISO XXXXX	International standard adopted only on national (Germany) level
DIN EN ISO XXXXX	International standard adopted on European and national level

### 4.3 Standardization documents

#### 4.3.1 General

There are several types of standardization documents that differ in their development process, the degree of consensus to be reached, and the openness to participation (Figure 2). Standardization documents describe products, systems or services by defining their characteristics and requirements and in many cases are publicly available.

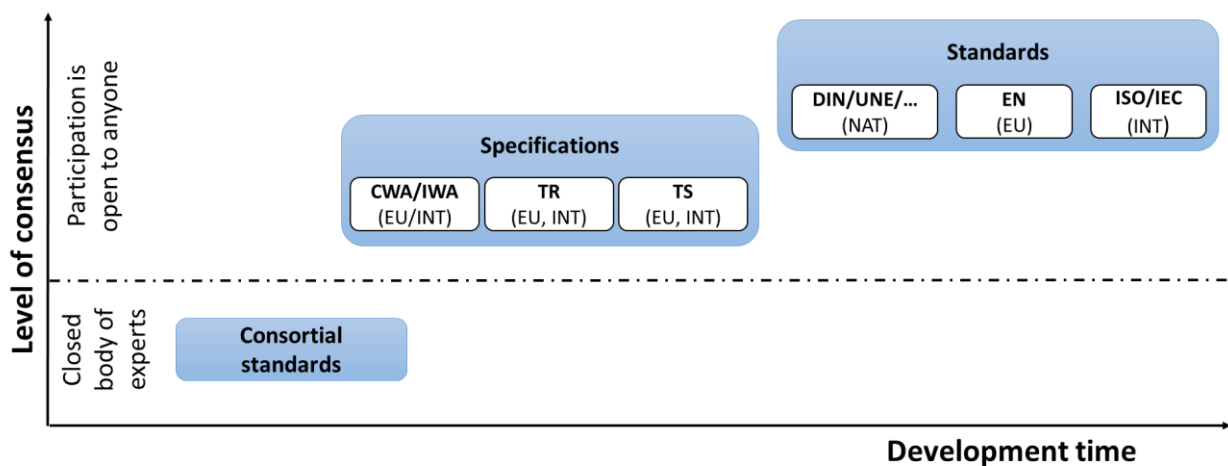


Figure 2: Types of standardization documents

#### 4.3.2 Standard

According to Figure 3, **standards** in the narrower sense are developed within the formal standardization system where all interested parties have to be included in the development process of the document and consensus, meaning the general agreement of all participants and the lack of sustained objection to central content, must be reached. Therefore, a public commenting phase is mandatory in the development of standards. The main objective of the consensus is to take into account the views of all interested parties concerned and to dispel any counter-arguments. The development of a European standard is shown in Figure 3.





Figure 3: Development of a standard

First of all, anyone who has identified a need for a standard can submit a proposal for a new standard. In most cases this has to be done via the national mirror committee. The associated standards committee evaluates the need and whether standardization activities are already taking place or if standards that cover the described need exist. If the need is confirmed, a standard is then developed in a standardization committee. Attention is paid to a balanced composition of these committees with all interested parties concerned (science, consumers, industry, ...) in order to guarantee the neutrality of the documents. A final draft, approved by the standards committee, is then released for public comment. All comments have to be discussed before the final standard is approved by the standardization committee. Due to the high level of transparency and the involvement of the public, the development time increases from national to European and international level. National standards usually require 18 months to develop, while the development of European and international standards normally takes more than two years due to the involvement of the national standardization bodies [9]. Due to the high degree of consensus, standards have a high level of acceptance in society.

#### 4.3.3 Specification

To better understand the difference between the various standardization documents, the terms specification and standard are used. However in many cases both documents will be called standards. In contrast to a standard created in consensus, the standardization activities in research projects focus mainly on the development of **specifications**. Compared to a standard, consensus is not mandatory in specifications and the involvement of all interested parties is not obligatory. The development of a specification, e.g. CWA on European level, is shown in Figure 4.



01

**Anyone can initiate a specification**



A specification is the **fastest way** to take an innovative idea and establish it on the market.

02

**During the workshop phase, the parties develop the content of the specification**



Specifications do not require full consensus and the involvement of all stakeholders. The workshop participants decide whether or not to make the pre-standard draft available for public comment.

03

**A Standardization organization publishes the final specification...**



... so that innovative solutions can quickly be established on the market. Any specification can be used as a **basis for developing a full Standard.**

Figure 4: Development of a specification

Anyone can submit an application to develop a specification. The scope of the specification will be compared with the existing standardization repository. If no conflicting standards exist, the standardization organization publishes the business plan for public comment and a call for cooperation from interested organizations. In contrast to standards, specifications are created in workshops (temporary committee). A standardization organisation acts as a secretary to ensure the procedural requirements and to support the members of the workshops in developing the specification. The workshop also decides whether a draft should be published for comment and once a specification has been successfully adopted by the workshop, the specification will be published.

There are different types of specifications. A Workshop Agreement on European or international (International Workshop Agreement, IWA) level is developed in a temporary workshop, which is designed to meet an immediate need and forms the basis for future standardization activities led by a national standardization body. Even if there are not as strict rules for developing a specification as there are for standards, it is important to ensure the coherence of the standardization regulations to protect the credibility of international, European, and national standardization. The workshop is open to direct participation by anyone who is interested in the development of the agreement but consensus is not required. The development of a Workshop Agreement is fast and flexible, on average between 10 and 12 months and therefore also attractive for research projects. Temporary workshops also develop national specifications, such as DIN SPECs (e.g., DIN SPEC 91392) in Germany.

Specifications can also be developed within standards committees if, for example, no final consensus can be reached. These documents are then referred to as CEN or ISO TS. A TS on European level may not conflict with a European standard but conflicting national standards may continue to exist. Technical Reports (TR) are de-facto documents that are developed and approved by a technical committee. A TR provides information on technical content and standardization work.

#### 4.3.4 Consortial standards

Regarding the development time, the fastest ones are **consortial standards** (see Figure 2), also called industry, informal or de-facto standards. Among other things, they are characterised by the fact that not all interested parties need to be included in the development process. These closed group of experts can be, e.g. industry-specific consortia that have been formed from different companies. Although these documents

have some characteristics of a standardization document, such as defined procedures or documentation rules, consortial standards are often not freely accessible and are developed in private.

#### 4.4 Standardization in research projects

It is crucial for a research and innovation (R&I) project to know the state of the art in the areas relevant for or connected to the project. Since standards reflect this state of the art in a specific area it is essential for R&I projects to have an overview of the standardization landscape related to the project. This knowledge enables the project to tailor its results or findings to current market requirements and helps ensure that they are interoperable with existing solutions. R&I projects need to consider the developments within other relevant activities. Irrespective of the technical merits of the R&I project developments, these efforts will be inconsequential if developed in isolation and the market decides to follow another path.

Furthermore, the knowledge about related standards also enables the R&I project to overcome additional challenges and go beyond the current state of the art. On the one hand, an overview of the related standardization landscape offers an R&I project the advantages described above. On the other hand, awareness is raised on where standardization is still needed. This opportunity can be used by the R&I project to implement project results in already ongoing standardization activities or by developing new standards from project results.

For ESCALATE in particular, aspects of standardization play an important role. The European research framework program Horizon Europe addresses the topic of standardization in a series of calls for proposals.



## 5 Methodology: How the ESCALATE standardization landscape was developed

This section describes how the standardization landscape relevant for ESCALATE was developed. A standardization landscape for a specific topic provides an overview of the existing standardization documents relevant and related to the defined topic(s). Such an overview of the standardization landscape for ESCALATE should raise awareness among all project partners on what already exists on the market and prevents them from re-inventing the wheel. Further, the standardization landscape provides the basis for further standardization activities of the project. The approach to developing a standardization landscape is shown in Figure 5.

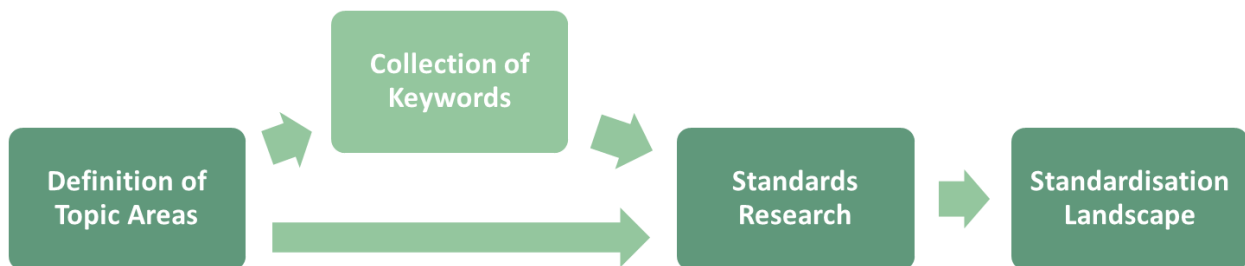


Figure 5: Steps for the development of the ESCALATE standardization landscape

Besides the need to define the electrification of the freight transport and HDV's, different WP's and tasks refer to the topic in different approaches. Thus, the first step was to analyze where the project partners needed an overview of existing standards in a specific area of ESCALATE.

The basis for providing a standardization landscape for the consortium is the standards research where all the relevant standards for the project are collected. To derive an overview of the current standardization landscape in the area of Electric Freight Transport a survey was conducted within ESCALATE. The survey consists of some general questions about the experience in and the general knowledge about standardization as well as current use of standards, previous involvement in standardization activities and already identified gaps in the standardization landscape.

The most important part of the survey are the provided keywords for the standard research. The keywords obtained in the survey served as the basis for research on existing standards and standards under development, as well as identified relevant committees at European and international level. Those keywords were used to search existing standards (standards research) by using the standards data base Nautos [10]. The data base includes national standards as well as standards from the European organizations CEN, CENELEC, ETSI, and international organizations such as ISO, IEC, and ITU. Regulations, technical documents, and reports on these levels have been considered for the analysis. In case of national standards, it should be noted that due to language barriers mostly those providing at least one English title have been considered. All the hits from the Nautos search, using the different keywords, resulted in a list of 624 standards and were clustered in general categories which is shown in Table 2.

Table 2: Overview of the general categories of identified documents

Category	Number of identified standards
<i>Electrics</i>	162
<i>Hydrogen</i>	126
<i>Data and information</i>	132
<i>Sustainability, ecology and economics</i>	14
<i>Safety</i>	129
<i>Artificial intelligence</i>	9
<i>Traffic, vehicles and logistics</i>	52

## 5.1 General

This section gives an overview of the standardization landscape related to ESCALATE. Besides providing a general overview of standards which could be relevant for ESCALATE, relevant standardization committees that are active in the fields interesting for ESCALATE are also given. Using the keywords provided, a total of 624 standards was identified including those mentioned in the survey which are used by the consortium already. A comprehensive table with all identified and potentially relevant standards including number and title is attached to the deliverable (Annex). These standards represent the first overview of the standardization landscape for ESCALATE and were therefore shared with the partners in form of an interactive dashboard (Figure 6). The dashboard is an Excel tool, which was developed specifically for the research of standards and provides an overview of the main information regarding relevant standards. It can be used to search for specific standards using keywords or to get an overview of the standards within a specific ICS (International Classification for Standards) field or developed by a specific technical committee. This dashboard was shared within the whole ESCALATE consortium in September 2023. Since the development of standards does not stand still, the dashboard will be updated annually.



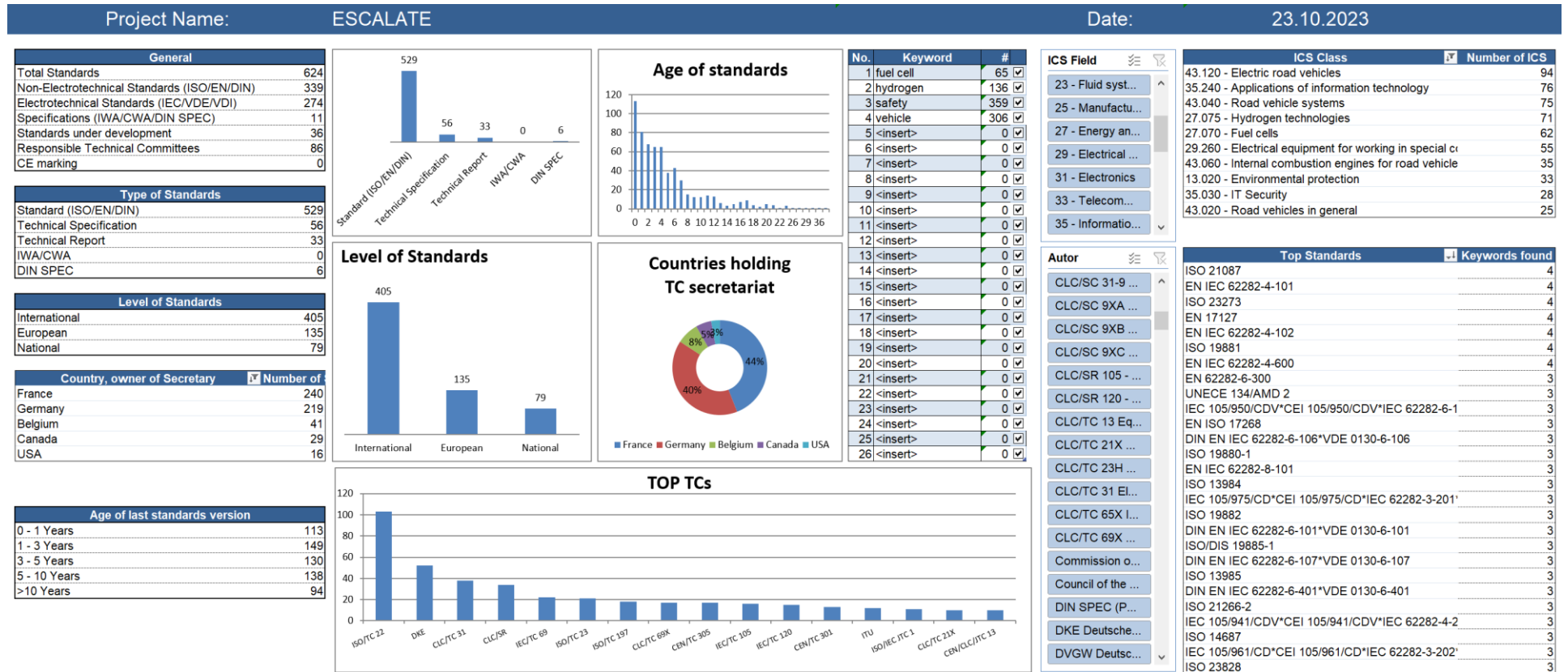


Figure 6: ESCALATE standards dashboard

The dashboard is also used to provide some general information on standards that might be relevant to ESCALATE. In Figure 7 the origin of the documents included in the ESCALATE dashboard is visualized. The majority (65 %) of the standards was developed on international level, whereas around 22 % originated on European level and the minority of below 13 % on national level. The reason for the small number of national standards added to the standardization dashboard is due to the fact that national standards were mostly excluded during the standards research. ESCALATE is a European research project and therefore individual national standards are of secondary importance for the first overview of the standardization landscape. National standards will be added to this overview in accordance with the needs of the project partners. Therefore, only standards on international and European level are looked at in the following subsection. In

**TYPE OF STANDARDIZATION DOCUMENT**

■ Standard (ISO/EN/DIN) ■ Technical Specification ■ Technical Report ■ DIN SPEC

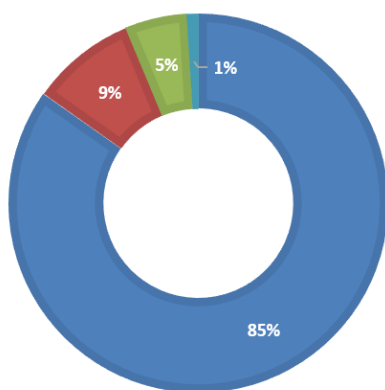


Figure 8 the type of the listed standardization documents is broken down. 85 % of the documents included in the dashboard are standards in the narrower sense (see subsection 4.3.2) like ISO- / EN- or national standards whereas the rest are specifications and reports. Nearly 63 % of the documents were published or revised within the last 5 years.

**LEVEL OF STANDARDS**

■ International ■ European ■ National

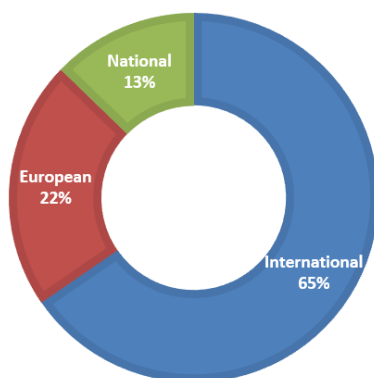


Figure 7: Level of standards

**TYPE OF STANDARDIZATION DOCUMENT**

■ Standard (ISO/EN/DIN) ■ Technical Specification ■ Technical Report ■ DIN SPEC

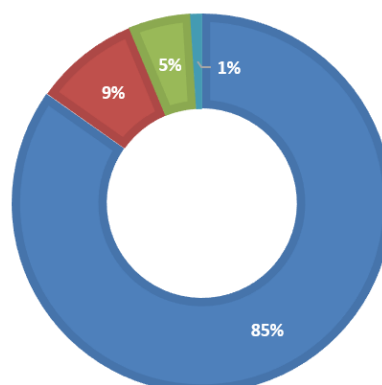


Figure 8: Type of standardization documents

The standards related to the ESCALATE cover a wide range of different areas. Based on the ICS (International Classification for Standards) fields, an overview of the different areas can be given.

The ICS is intended to serve as a structure for catalogues of international, regional, and national standards and other normative documents, as well as a basis for standing-order systems for international, regional and national standards [11]. For this overview only ICS fields which are assigned to at least 25 standards are listed in Table 3. The most present ICS fields are “43 - Road vehicles engineering”, “27 - Energy and heat transfer engineering” and “35 - Information technology”. It is important to keep in mind that one standard can be part of several different ICS fields. 15 % of the standards included in the ESCALATE dashboard are classified within the ICS field “43.120 - Electric road vehicles” and 12 % of the standards are included in the ICS fields “35.240 - Applications of information technology” and “43.040 - Road vehicle systems”. Nearly the same number of standards are part of “27.075 - Hydrogen technologies” (11 %) and “27.070 - Fuel cells” (10 %).





Table 3: Overview of the number of standards in the different ICS fields (624 standards in total)

<i>Main field</i>	<i>ICS-field</i>	<i>Number of standards</i>
<b>43 - Road vehicles engineering</b>	43.020 - Road vehicles in general	25
	43.040 - Road vehicle systems	75
	43.060 - Internal combustion engines for road vehicles	35
	43.120 - Electric road vehicles	94
<b>27 - Energy and heat transfer engineering</b>	27.070 - Fuel cells	62
	27.075 - Hydrogen technologies	71
<b>35 - Information technology</b>	35.030 - IT Security	28
	35.240 - Applications of information technology	76
<b>29 - Electrical engineering</b>	29.260 - Electrical equipment for working in special conditions	55
<b>13 - Environment. Health protection. Safety</b>	13.020 - Environmental protection	33

## 5.2 Standardization activities on international level

From the standards which could be relevant for ESCALATE, 405 documents from international level were included in the ESCALATE dashboard. The main technical committees (TC's), which are responsible for these standards, are listed in Table 4 and are described in the following. Only TC's that published 11 standards or more of the ones included in the dashboard, are listed and described below.

Table 4: Relevant standard setting organizations and TC's on international level

<i>TC name</i>	<i>TC title</i>
<b>ISO/TC 22</b>	Road vehicles
<b>IEC/TC 69</b>	Electrical power/energy transfer systems for electrically propelled road vehicles and industrial trucks
<b>ISO/TC 197</b>	Hydrogen technologies
<b>IEC/TC 105</b>	Fuel cell technologies
<b>IEC/TC 120</b>	Electrical Energy Storage (EES) systems
<b>ISO/IEC JTC 1</b>	Information technology
<b>ISO/TC 23</b>	Tractors and machinery for agriculture and forestry
<b>ITU</b>	International Telecommunication Union

The **ISO/TC 22 – Road vehicles** focuses on all aspects for all types of road vehicles. This includes interfaces approved for operation on public roads for the entire life cycle in terms of safety, protection, sustainability,

compatibility, interchangeability, maintenance, performance evaluation and quality. Vehicle-related aspects like hardware and software, driving automation, communication and connected driving, test equipment and tools are also included. Its secretariat is held by AFNOR (France). It has already published 1003 ISO standards, whereas nearly 200 are currently under development. Regarding the related international standards for ESCALATE, 103 of them were developed by this TC. ISO/TC 22 is composed of 11 sub-committees whereas the most relevant ones are described in the following [12]:

- *SC 32 - Electrical and electronic components and general system aspects* addresses electrical and electronic components and cross-sectional specifications for electrical and electronic systems and components. This SC already published 162 ISO standards and 31 standards are currently under development [14].
- *SC 31 - Data communication*. This SC published 154 standards so far whereas 33 standards are under development in the field of data communication for vehicle applications including data buses and protocols, V2X communication, diagnostics, test protocols, interfaces and gateways, data formats and standardized data content [15]. Table 5 shows a selection of the standards currently being developed, considering their relevance to the ESCALATE project.
- *SC 37 - Electrically propelled vehicles*. The scope of this TC are specific aspects of electrically propelled road vehicles such as electric propulsion systems, related components as well as their vehicle integration. 28 ISO standards are already published, and 14 standards are currently under development by this SC [13]. On international level, this appears to be a highly relevant SC for the ESCALATE project as its scope corresponds to the core topic of the project. For this reason, the standards currently under development by this SC are listed in Table 6.
- *SC 40 - Specific aspects for light and heavy commercial vehicles, busses and trailers*. This SC already published 66 ISO standards and 5 are currently under development. Its work is about specific aspects for heavy duty trucks, commercial vehicles, busses, trailers, as well as their bodyworks and interfaces which are not covered by other SCs of ISO/TC 22 [16].

Table 5: Standards under development from ISO/TC 22 SC 31

Document No.	Title
ISO/AWI 1979-3	Road vehicles — On-board diagnostic communication — Part 3: Zero emissions propulsion systems
ISO/DIS 15118-2	Road vehicles — Vehicle-to-grid communication interface — Part 2: Network and application protocol requirements
ISO/CD 15118-3	Road vehicles — Vehicle to grid communication interface — Part 3: Physical and data link layer requirements
ISO/DIS 15118-10	Road vehicles — Vehicle to grid communication interface — Part 10: Physical layer and data link layer requirements for single-pair Ethernet
ISO 15118-20:2022/AWI Amd 1	Road vehicles — Vehicle to grid communication interface — Part 20: 2nd generation network layer and application layer requirements — Amendment 1
ISO/WD 15118-21	Road vehicles — Vehicle to grid communication interface — Part 21: Common 2nd generation network layer and application layer requirements conformance test plan
ISO/AWI PAS 15118-23	Road vehicles — Vehicle to grid communication interface — Part 23: 2nd generation network layer and application layer requirements conformance test plan - DC charging

Table 6: Standards under development from ISO/TC 22 SC 37

Document No.	Title
ISO/FDIS 5474-1	Electrically propelled road vehicles — Functional requirements and safety requirements for power transfer — Part 1: General requirements for conductive power transfer
ISO/FDIS 5474-2	Electrically propelled road vehicles — Functional requirements and safety requirements for power transfer — Part 2: AC power transfer
ISO/FDIS 5474-3	Electrically propelled road vehicles — Functional requirements and safety requirements for power transfer — Part 3: DC power transfer
ISO/CD 5474-4	Electrically propelled road vehicles — Functional requirements and safety requirements for power transfer — Part 4: Magnetic field wireless power transfer — Safety and interoperability requirements
ISO/DTS 5474-5.2	Electrically propelled road vehicles — Functional requirements and safety requirements for power transfer — Part 5: Automatic conductive power transfer
ISO/CD PAS 5474-6	Electrically propelled road vehicles — Interoperability and safety of dynamic wireless power transfer (D-WPT) for electric
ISO/CD TR 8713	Electrically propelled road vehicles — Vocabulary
ISO/TR 11954	Fuel cell road vehicles — Performance measurement — Vehicles fuelled with compressed hydrogen
ISO/SAE DIS 12906	Road vehicles — Test procedures for electrical vehicles to determine charging performance
ISO/TR 17326	Fuel cell road vehicles — Cold start performances under sub-zero temperature — Vehicles fuelled with compressed hydrogen
ISO/AWI 18006-1	Electrically propelled road vehicles — Battery information — Part 1: Labelling and QR/bar code for specification, safety and sustainability
ISO/AWI 18006-2	Electrically propelled road vehicles — Battery information — Part 2: End of life
ISO/DIS 21498-2	Electrically propelled road vehicles — Electrical specifications and tests for voltage class B systems and components — Part 2: Electrical tests for components
IEC 62752:2016/CD Amd 1	In-Cable Control and Protection Device for mode 2 charging of electric road vehicles (IC-CPD) — Amendment 1

22 of the standards in the dashboard were published by the **IEC/TC 69 - Electrical power/energy transfer systems for electrically propelled road vehicles and industrial trucks** whose creation date was in 1947. Its scope is to prepare publications in the field of electrical power/energy transfer systems for electrically propelled road vehicles and industrial trucks drawing current from a rechargeable energy storage system. Conductive power/energy transfer, wireless power/energy transfer and battery swap are possibilities to transfer power/energy. The publications can cover general and functional requirements as well as the communication between the vehicle and its supply equipment. The management of the corresponding infrastructures in view of offering the associated value-added services is also part of the scope of this TC [17]. This TC already published 35 standards and because of its scope it seems to be also highly relevant for the ESCALATE project. Therefore, all standards under development within this TC are listed in Table 7.

Table 7: Standards under development from IEC/TC 69

Document No.	Title
IEC 60050-YYY	EV Supply equipment – Part YYY: Vocabulary
IEC 61851-1 ED4	Electric vehicle conductive charging system - Part 1: General requirements
IEC 61851-21-1 ED2	Electric vehicle conductive charging system - Part 21-1 Electric vehicle on-board charger EMC requirements for conductive connection to AC/DC supply
IEC 61851-21-2 ED2	Electric vehicle conductive charging system - Part 21-2: Electric vehicle requirements for conductive connection to an AC/DC supply - EMC requirements for off board electric vehicle charging systems
IEC 61851-23 ED2	Electric vehicle conductive charging system - Part 23: DC electric vehicle supply equipment
IEC 61851-23-3 ED1	Electric vehicle conductive charging system - Part 23-3: DC electric vehicle supply equipment for Megawatt charging systems
IEC 61851-24 ED2	Electric vehicle conductive charging system - Part 24: Digital communication between a DC EV supply equipment and an electric vehicle for control of DC charging
IEC TS 61851-26 ED1	Electric vehicle conductive charging system - Part 26: EV supply equipment with automated connection of a vehicle coupler located at the underbody of an electric vehicle
IEC TS 61851-27 ED1	Electric vehicle conductive charging system - Part 27: EV supply equipment with automated connection of a vehicle coupler according to IEC 62196-2 or IEC 62196-3
IEC 61980-4 ED1	Interoperability and safety of high power wireless power transfer (H-WPT) for electric vehicles
IEC 62576-2 ED1	Electrical characteristics test methods of EDLC Module for Electric road vehicles
IEC 62840-1 ED1	Electric vehicle battery swap system - Part 1: General and guidance
IEC 62840-2 ED2	Electric vehicle battery swap system - Part 2: Safety requirements
IEC 63119-1 ED2	Information exchange for electric vehicle charging roaming service - Part 1: General
IEC 63243 ED1	Interoperability and safety of dynamic wireless power transfer (WPT) for electric vehicles
IEC 63380-1 ED1	Local Charging station management systems and Local Energy Management Systems network connectivity and information exchange - Part -1 General Requirements, Use Cases and abstract Messages
IEC 63380-2 ED1	Local Charging station management systems and Local Energy Management Systems network connectivity and information exchange - Part 2 Specific Data Model Mapping
IEC 63380-3 ED1	Local Charging station management systems and Local Energy Management Systems network connectivity and information exchange - Part 3 Communication Protocol and Cybersecurity Specific Aspects
IEC 63380-4 ED1	Local Charging station management systems and Local Energy Management Systems network connectivity and information exchange - Part-4 Test Specifications
IEC 63381 ED1	Communication requirements of dynamic wireless power transfer (D-WPT) for electric vehicles
IEC 63382-1 ED1	Management of Distributed Energy Storage Systems based on Electrically Chargeable Vehicles (ECV-DESS) - Part 1: Definitions, Requirements and Use Cases
IEC 63382-2 ED1	Management of Distributed Energy Storage Systems based on Electrically Chargeable Vehicles (ECV-DESS) - Part 2: Data models Protocols, Messages
IEC 63382-3 ED1	Management of Distributed Energy Storage Systems based on Electrically Chargeable Vehicles (ECV-DESS) - Part 3: Conformance tests
ISO 15118-2 ED2	Road vehicles -- Vehicle-to-Grid Communication Interface -- Part 2: Network and application protocol requirements
ISO 15118-4 ED2	Road vehicles - Vehicle to grid communication interface - Part 4: Network and application protocol conformance test
ISO 15118-21 ED1	Road vehicles – Vehicle to grid communication interface – Part 21: Common 2nd generation network layer and application layer requirements conformance test plan

The scope of the **ISO/TC 197 - Hydrogen technologies** is standardization in the field of systems and devices for the production, storage, transport, measurement and use of hydrogen. All 18 standards developed by this TC are also included in the dashboard. Other 19 standards are currently under development. The creation date of the TC was 1990 and it includes the subcommittee ISO/TC 197/SC 1 - Hydrogen at scale and horizontal energy systems [18]. The SC focusses on large scale hydrogen energy systems and applications including aspects of testing, certification, sustainability and placement [19].

**IEC/TC 105 - Fuel cell technologies.** The scope of this TC is to prepare international standards regarding fuel cell technologies for all fuel cell types and various associated applications such as stationary fuel cell power systems for distributed power generators and combined heat and power systems, fuel cells for transportation such as propulsion systems, range extenders, auxiliary power units, portable fuel cell power systems, micro fuel cell power systems, reverse operating fuel cell power systems, and general electrochemical flow systems and processes. [20] This TC already published 31 standards whereas 15 are under development.

From **IEC/TC 120 - Electrical Energy Storage (EES) systems** 8 standards in the dashboard were published and it deals with defining unit parameters, testing methods, planning and installation, guide for environmental issues and system safety aspects in the field of grid integrated EES systems in order to support grid requirements. The TC has both 12 standards already published and currently in development [21].

**ISO/IEC JTC 1 - Information technology** founded in 1987 is a joint technical committee from ISO and IEC focusing on the development of ICT standards for business and consumer applications [22]. It has already published 3428 ISO/IEC standards, whereas nearly 500 are currently under development. Regarding the related international standards for ESCALATE, 29 of them were developed by this Joint Technical Committee (JTC). Under the direct responsibility of this JTC 11 standards were developed whereas the others were developed within subcommittees. ISO/IEC JTC1 is composed of 23 subcommittees whereas the most relevant ones are described in the following [23]:

- *SC 27 - Information security, cybersecurity and privacy protection* published 9 of the ESCALATE related standards of the dashboard. This SC was created in 1989 and aims to develop standards for the protection of information and ICT. This includes generic methods, techniques and guidelines to address both security and privacy aspects. There are already 238 standards which were published by this SC and 60 are under development [24].
- *SC 42 - Artificial intelligence* developed 3 of those standards. This SC was created in 2017 and serves as the focus and proponent for JTC 1's standardization program on Artificial Intelligence. It provides guidance to JTC 1, IEC, and ISO committees developing Artificial Intelligence applications. This SC already published 20 ISO standards whereas 33 are under development [25].
- *SC 6 - Telecommunications and information exchange between systems.* Since this SC was established in 1964 published 397 standards in the field of telecommunications dealing with the exchange of information between open systems, including system functions, procedures, parameters as well as the conditions for their use. 3 of these standards are related to ESCALATE and 18 standards are currently under development by this SC. The standardization by this SC encompasses protocols and services of lower layers including physical, data link, network, and transport as well as those of upper layers [26].

**ITU** published 12 of the standards included in the dashboard. ITU is the United Nations specialized agency for information and communication technologies. Independently from the UN, it was founded in 1865 to facilitate international connectivity in communication networks. Among the allocation of global radio spectrum and satellite orbits, it develops technical standards that ensure that networks and technologies interconnect [27].

### 5.3 Standardization activities on European level

On European level, according to the standardization dashboard, 135 documents relevant for ESCALATE was published so far. In Table 8 the main technical committees, which are responsible for these standards are listed and described below. In this section, only those committees responsible for 10 or more documents in the dashboard are considered.

Table 8: Relevant standard setting organizations and TC's on European level

TC name	TC title
CLC/SR 105	Fuel cell technologies
CLC/TC 69X	Electrical systems for electric road vehicles
CEN/TC 301	Road vehicles
CEN/CLC/JTC 13	Cybersecurity and Data Protection
CLC/TC 31	Electrical apparatus for potentially explosive atmospheres
CEN/TC 305	Potentially explosive atmospheres - Explosion prevention and protection

**CLC/SR 105 - Fuel cell technologies** is a reporting secretariat, which means that it exists to provide information to the CENELEC Technical Board on any work of IEC Technical Committees and Subcommittees which could be of interest to CENELEC. It provides information to the IEC/TC 105 (see subsection 3.2) if this technical committee wishes to examine a technical problem or to investigate a situation in an area not already covered by its scope [28]. CLC/SR 105 already published 22 standards and 13 are currently under development.

From the **CLC/TC 69X - Electrical systems for electric road vehicles** 17 of the documents included in the standardization dashboard were published. This TC is a mirror committee of IEC/TC 69, and its scope is to prepare European standards related to electrical systems for road vehicles, totally or partly propelled from self-contained power sources [29]. On the one hand a European mirror committee reflects the standardization activities of its international counterpart and on the other hand it summarizes all comments into a common European statement and forwards it to the international TC. In total this TC already published 19 standards and 32 are currently under development.

The scope of **CEN/TC 301 - Road vehicles** is the preparation of European standards for road vehicles. Since the automotive industry operates globally, the ISO/TC 22 Road Vehicles (see subsection 3.2) on international level has top priority for all other standardization projects [30]. This TC has published 13 standards which are included in the dashboard and 33 standards in total. Currently there are 11 documents under development.

**CEN/CLC/JTC 13 - Cybersecurity and Data Protection** has published 10 standards related to ESCALATE, according to the dashboard. Its scope is to develop standards for cybersecurity and data protection covering all aspects of the evolving information society. This includes e.g., management systems, frameworks, methodologies as well as data protection and privacy [31]. The JTC already published 41 standardization documents, whereas 20 are under development.

Within the **CLC/TC 31 - Electrical apparatus for potentially explosive atmospheres** 38 documents with a relation to ESCALATE were already developed. This TC in general deals with European standards relating



to equipment for use where there is a hazard due to the possible presence of explosive atmospheres of gases, vapours, mists or combustible dusts [32]. CLC/TC 31 is composed of 2 subcommittees [33]:

- *CLC/SC 31-8 - Electrostatic painting and finishing equipment* standardizes specific requirements for the construction, testing and use of electrostatic paint and powder equipment for spraying flammable materials. This SC already published 7 standards and 1 document is presently under development [33].
- *CLC/SC 31-9 - Electrical apparatus for the detection and measurement of combustible gases to be used in industrial and commercial potentially explosive atmospheres.* The scope of this SC are general and specific requirements for construction, safety, performance and testing of apparatus for sensing the presence of combustible gases or vapours and for measuring their concentration in industrial and commercial potentially explosive atmospheres. It published 16 standards and is currently in the development of 2 documents [35].

**CEN/TC 305 - Potentially explosive atmospheres - Explosion prevention and protection.** The scope of this TC is to develop standards in the areas of test methods for determining the flammability of substances and of equipment and protective systems for use in potentially explosive atmospheres and of equipment and systems for preventing and protecting against explosions. It already published 34 standardization documents in total and 17 of them are included in the ESCALATE dashboard. There are also 16 standards currently under development [36].



## 6 Summary and Conclusion

Generally, the present deliverable provides an overview of the standardization landscape related to ESCALATE and therefore summarizes the results of Task 7.5 – *Standardization activities*. The knowledge about existing standards is important for the project since it enables the development of solutions which are compliant with the latest standards and further paves the way for upcoming liaison activities with relevant technical committees. Therefore, a standards database in form of a dashboard was created, which includes 624 standards that could be relevant for the project. On the one hand, this dashboard offers the opportunity to search for specific standards. On the other hand, the overview of this dashboard provides the opportunity to identify standardization gaps and is therefore the basis for the following standardization activities. Within this deliverable, the dashboard was used to describe the standardization activities on international and European level related to ESCALATE. Specific focus was put on areas that have a high relevance for the project. Besides listing relevant standards, this deliverable offers an overview of the TC's that are working on standards related to ESCALATE. Since the interaction with relevant standardization committees is envisaged within ESCALATE, an overview of current work items of the most relevant TC's is provided. In this context it is also worth mentioning the importance to really focus on specific areas within a broad field like the electrification of the freight transport and HDV's. The next steps include to focus further on these areas to initiate targeted standardization activities within ESCALATE. Thus, the contribution to ongoing or the initiation of new standardization activities is sought. A workshop will be held to analyze the existence of possible standardization gaps and the need to adapt standards in connection with ESCALATE's work. This will then lead directly to the initiation of standardization activities. Altogether, through the work done in T7.5, awareness for standardization was raised throughout the consortium and the foundation was laid for the subsequent subtasks.





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## Annex

Document No.	Title
DIN EN ISO 11688-2	Acoustics - Recommended practice for the design of low-noise machinery and equipment - Part 2: Introduction to the physics of low-noise design (ISO/TR 11688-2:1998); German version EN ISO 11688-2:2000
DIN EN ISO 11819-1	Acoustics - Measurement of the influence of road surfaces on traffic noise - Part 1: Statistical pass-by method (ISO 11819-1:1997); German version EN ISO 11819-1:2001
DIN EN ISO 20270	Acoustics - Characterization of sources of structure-borne sound and vibration - Indirect measurement of blocked forces (ISO 20270:2019); German and English version prEN ISO 20270:2022
DIN 45642	Measurement of traffic noise
DIN 45678	Mechanical vibration - Articulated trucks - Laboratory method for evaluating vehicle seat vibration, with CD-ROM
AD 2000-Merkblatt HP 801 Nr. 34	Special pressure vessels - Ammonia storage vessels
BAAINBw TL 3655-0030	Technical specifications - Hydrogen transfer unit
TRT 511	Technische Richtlinien festverbundene Tanks, Aufsetztanks und Gefäßbatterien (TRTF), Kesselwagen (TRKW); Dichtheit der Verschlusseinrichtungen beim Umkippen der Tanks für wässrige Lösungen von Wasserstoffperoxid und für Wasserstoffperoxid
CEN-CENELEC Guide 38* CEN/CENELEC Guide 38	Guide for multifuel stations
EN ISO/IEC 15408-1	Information technology - Security techniques - Evaluation criteria for IT security - Part 1: Introduction and general model (ISO/IEC 15408-1:2009)
EN ISO/IEC 15408-2	Information technology - Security techniques - Evaluation criteria for IT security - Part 2: Security functional components (ISO/IEC 15408-2:2008)
EN ISO/IEC 15408-3	Information technology - Security techniques - Evaluation criteria for IT security - Part 3: Security assurance components (ISO/IEC 15408-3:2008, Corrected version 2011-05)
prEN 17926	Privacy Information Management System per ISO/IEC 27701 - Refinements in European context
EN ISO/IEC 24760-1	IT Security and Privacy - A framework for identity management - Part 1: Terminology and concepts (ISO/IEC 24760-1:2019)
EN ISO/IEC 24760-2	Information technology - Security techniques - A framework for identity management - Part 2: Reference architecture and requirements (ISO/IEC 24760-2:2015)
prEN ISO/IEC 27001	Information security, cybersecurity and privacy protection - Information security management systems - Requirements (ISO/IEC 27001:2022)
EN ISO/IEC 27007	Information security, cybersecurity and privacy protection - Guidelines for information security management systems auditing (ISO/IEC 27007:2020)
EN ISO/IEC 27019	Information technology - Security techniques - Information security controls for the energy utility industry (ISO/IEC 27019:2017, Corrected version 2019-08)
EN ISO/IEC 27701	Security techniques - Extension to ISO/IEC 27001 and ISO/IEC 27002 for privacy information management - Requirements and guidelines (ISO/IEC 27701:2019)
FprEN 62282-3-400	Fuel cell technologies - Part 3-400: Stationary fuel cell power systems - Small stationary fuel cell power system with combined heat and power output (IEC 62282-3-400:2016, modified)
EN ISO/IEC 22989	Information technology - Artificial intelligence - Artificial intelligence concepts and terminology (ISO/IEC 22989:2022)
prEN ISO 24078	Hydrogen in energy systems - Vocabulary (ISO/DIS 24078:2023)
EN ISO/IEC 27000	Information technology - Security techniques - Information security management systems - Overview and vocabulary (ISO/IEC 27000:2018)
EN ISO 14040	Environmental management - Life cycle assessment - Principles and framework (ISO 14040:2006)
EN ISO 14040/A1	Environmental management - Life cycle assessment - Principles and framework - Amendment 1 (ISO 14040:2006/Amd 1:2020)
EN ISO 14044	Environmental management - Life cycle assessment - Requirements and guidelines (ISO 14044:2006)
EN ISO 14044/A1	Environmental management - Life cycle assessment - Requirements and guidelines - Amendment 1 (ISO 14044:2006/Amd 1:2017)

EN ISO 14044/A2	Environmental management - Life cycle assessment - Requirements and guidelines - Amendment 2 (ISO 14044:2006/Amd 2:2020)
EN 17106-1	Road operation machinery - Safety - Part 1: General requirements
EN ISO 15330	Fasteners - Preloading test for the detection of hydrogen embrittlement - Parallel bearing surface method (ISO 15330:1999)
CEN ISO/TR 20491	Fasteners - Fundamentals of hydrogen embrittlement in steel fasteners (ISO/TR 20491:2019)
EN 17533	Gaseous hydrogen - Cylinders and tubes for stationary storage
EN ISO 10326-1	Mechanical vibration - Laboratory method for evaluating vehicle seat vibration - Part 1: Basic requirements (ISO 10326-1:2016, Corrected version 2017-02)
prEN 12007-5	Gas infrastructure - Pipelines for maximum operating pressure up to and including 16 bar - Part 5: Service lines - Specific functional requirements
EN 12583	Gas Infrastructure - Compressor stations - Functional requirements
EN 15001-1	Gas Infrastructure - Gas installation pipework with an operating pressure greater than 0,5 bar for industrial installations and greater than 5 bar for industrial and non-industrial installations - Part 1: Detailed functional requirements for design, materials, construction, inspection and testing
EN 15001-2	Gas supply systems - Gas installation pipework with an operating pressure greater than 0,5 bar for industrial installations and greater than 5 bar for industrial and non-industrial installations - Part 2: Detailed functional requirements for commissioning, operation and maintenance
EN 17649	Gas infrastructure - Safety Management System (SMS) and Pipeline Integrity Management System (PIMS) - Functional requirements
CEN/TR 17797	Gas infrastructure - Consequences of hydrogen in the gas infrastructure and identification of related standardisation need in the scope of CEN/TC 234
prEN 17928-1	Gas infrastructure - Injection stations - Part 1: General requirements
prEN 17928-3	Gas infrastructure - Injection stations - Part 3: Specific requirements regarding the injection of hydrogen fuel gas
EN 17124	Hydrogen fuel - Product specification and quality assurance for hydrogen refuelling points dispensing gaseous hydrogen - Proton exchange membrane (PEM) fuel cell applications for vehicles
EN 17127	Outdoor hydrogen refuelling points dispensing gaseous hydrogen and incorporating filling protocols
EN ISO 17268	Gaseous hydrogen land vehicle refuelling connection devices (ISO 17268:2020)
EN 16312	Intelligent transport systems - Automatic Vehicle and Equipment Registration (AVI/AEI) - Interoperable application profile for AVI/AEI and Electronic Register Identification using dedicated short range communication
EN ISO 17261	Intelligent transport systems - Automatic vehicle and equipment identification - Intermodal goods transport architecture and terminology (ISO 17261:2012)
CEN ISO/TS 21184	Cooperative intelligent transport systems (C-ITS) - Global transport data management (GTDM) framework (ISO/TS 21184:2021)
CEN/TS 16157-10	Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 10: Energy infrastructure publications
CEN/TR 15762	Road transport and traffic telematics - Electronic fee collection (EFC) - Ensuring the correct function of EFC equipment installed behind metallised windshield
CEN/TS 16405	Intelligent transport systems - Ecall - Additional data concept specification for heavy goods vehicles
CEN/TR 17249-1	Intelligent transport systems - eSafety - Part 1: Extending eCall to other categories of vehicle
CEN/TS 17249-2	Intelligent transport systems - eSafety - Part 2: eCall for HGVs and other commercial vehicles
EN ISO 15118-3	Road vehicles - Vehicle to grid Communication interface - Part 3: Physical and data link layer requirements (ISO 15118-3:2015)
EN ISO 15118-5	Road vehicles - Vehicle to grid communication interface - Part 5: Physical layer and data link layer conformance test (ISO 15118-5:2018)
EN ISO 15118-8	Road vehicles - Vehicle to grid communication interface - Part 8: Physical layer and data link layer requirements for wireless communication (ISO 15118-8:2020)
prEN ISO 15118-9	Road vehicles - Vehicle to grid communication interface - Part 9: Physical and data link layer conformance test for wireless communication (ISO 15118-9:2022)
EN ISO 15118-1	Road vehicles - Vehicle to grid communication interface - Part 1: General information and use-case definition (ISO 15118-1:2019)

EN ISO 15118-2	Road vehicles - Vehicle-to-grid communication Interface - Part 2: Network and application protocol requirements (ISO 15118-2:2014)
EN ISO 15118-20	Road vehicles - Vehicle to grid communication interface - Part 20: 2nd generation network layer and application layer requirements (ISO 15118-20:2022)
EN ISO 15118-4	Road vehicles - Vehicle to grid communication interface - Part 4: Network and application protocol conformance test (ISO 15118-4:2018)
EN 17186	Identification of vehicles and infrastructures compatibility - Graphical expression for consumer information on EV power supply
EN ISO 19363	Electrically propelled road vehicles - Magnetic field wireless power transfer - Safety and interoperability requirements (ISO 19363:2020)
EN ISO 16380	Road vehicles - Blended fuels refuelling connector (ISO 16380:2014, including Amd 1:2016)
EN ISO 17409	Electrically propelled road vehicles - Conductive power transfer - Safety requirements (ISO 17409:2020)
EN 17507	Road vehicles - Portable Emission Measuring Systems (PEMS) - Performance assessment
EN 1127-1	Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology
EN 1127-2	Explosive atmospheres - Explosion prevention and protection - Part 2: Basic concepts and methodology for mining
EN 13237	Potentially explosive atmospheres - Terms and definitions for equipment and protective systems intended for use in potentially explosive atmospheres
EN 15198	Methodology for the risk assessment of non-electrical equipment and components for intended use in potentially explosive atmospheres
EN 15233	Methodology for functional safety assessment of protective systems for potentially explosive atmospheres
CEN/TR 15281	Potentially explosive atmospheres - Explosion prevention and protection - Guidance on inerting for the prevention of explosions
EN ISO 80079-20-1	Explosive atmospheres - Part 20-1: Material characteristics for gas and vapour classification - Test methods and data (ISO/IEC 80079-20-1:2017)
EN ISO/IEC 80079-20-2	Explosive atmospheres - Part 20-2: Material characteristics - Combustible dusts test methods (ISO/IEC 80079-20-2:2016)
EN ISO/IEC 80079-20-2/AC	Explosive atmospheres - Part 20-2: Material characteristics - Combustible dusts test methods - Technical Corrigendum 1 (ISO/IEC 80079-20-2:2016/Cor 1:2017)
EN ISO/IEC 80079-34	Explosive atmospheres - Part 34: Application of quality systems for ex product manufacture (ISO/IEC 80079-34:2018)
EN ISO 80079-36	Explosive atmospheres - Part 36: Non-electrical equipment for explosive atmospheres - Basic method and requirements (ISO 80079-36:2016)
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EN ISO 80079-37	Explosive atmospheres - Part 37: Non-electrical equipment for explosive atmospheres - Non-electrical type of protection constructional safety "c", control of ignition sources "b", liquid immersion "k" (ISO 80079-37:2016)
EN ISO/IEC 80079-38	Explosive atmospheres - Part 38: Equipment and components in explosive atmospheres in underground mines (ISO/IEC 80079-38:2016)
EN ISO/IEC 80079-38/A1	Explosive atmospheres - Part 38: Equipment and components in explosive atmospheres in underground mines (ISO/IEC 80079-38:2016)
prEN ISO/IEC 80079-41	Explosive atmospheres - Part 41: Reciprocating internal combustion engines (ISO/IEC DIS 80079-41:2023)
prEN ISO/IEC 80079-49	Explosive atmospheres - Part 49: Flame arresters - Performance requirements, test methods and limits for use (ISO/IEC/DIS 80079-49:2022)
CEN/TR 17924	Safety and control devices for burners and appliances burning gaseous and/or liquid fuels - Guidance on hydrogen specific aspects
EN 50050	Electrical apparatus for potentially explosive atmospheres - Electrostatic hand-held spraying equipment
EN 60079-29-1	Explosive atmospheres - Part 29-1: Gas detectors - Performance requirements of detectors for flammable gases (IEC 60079-29-1:2016, modified)
EN 60079-29-1/A1	Explosive atmospheres - Part 29-1: Gas detectors - Performance requirements of detectors for flammable gases (IEC 60079-29-1:2016/A1:2020)
EN 60079-29-2	Explosive atmospheres - Part 29-2: Gas detectors - Selection, installation, use and maintenance of detectors for flammable gases and oxygen (IEC 60079-29-2:2015)

EN 60079-29-3	Explosive atmospheres - Part 29-3: Gas detectors - Guidance on functional safety of fixed gas detection systems (IEC 60079-29-3:2014)
EN 60079-29-4	Explosive atmospheres - Part 29-4: Gas detectors - Performance requirements of open path detectors for flammable gases (IEC 60079-29-4:2009)
EN 50163/A2	Railway applications - Supply voltages of traction systems
EN 61373	Railway applications - Rolling stock equipment - Shock and vibration tests (IEC 61373:2010)
EN 61373/AC	Railway applications - Rolling stock equipment - Shock and vibration tests (IEC 61373:2010/COR1:2011)
EN 50119	Railway applications - Fixed installations - Electric traction overhead contact lines
EN 50163	Railway applications - Supply voltages of traction systems
EN 50163/AC	Railway applications - Supply voltages of traction systems
EN 50163/A1	Railway applications - Supply voltages of traction systems
EN 50633	Railway applications - Fixed installations - Protection principles for AC and DC electric traction systems
EN IEC 62282-2-100	Fuel cell technologies - Part 2-100: Fuel cell modules - Safety (IEC 62282-2-100:2020)
EN IEC 62282-3-100	Fuel cell technologies - Part 3-100: Stationary fuel cell power systems - Safety (IEC 62282-3-100:2019)
EN 62282-3-200	Fuel cell technologies - Part 3-200: Stationary fuel cell power systems - Performance test methods (IEC 62282-3-200:2015)
EN 62282-3-201	Fuel cell technologies - Part 3-201: Stationary fuel cell power systems - Performance test methods for small fuel cell power systems (IEC 62282-3-201:2017)
EN 62282-3-201/A1	Fuel cell technologies - Part 3-201: Stationary fuel cell power systems - Performance test methods for small fuel cell power systems (IEC 62282-3-201:2017/AMD1:2022)
FprEN 62282-3-3	Fuel cell technologies - Part 3-3: Stationary fuel cell power systems - Installation
EN 62282-3-300	Fuel cell technologies - Part 3-300: Stationary fuel cell power systems - Installation (IEC 62282-3-300:2012)
EN IEC 62282-4-101	Fuel cell technologies - Part 4-101: Fuel cell power systems for electrically powered industrial trucks - Safety (IEC 62282-4-101:2022)
EN IEC 62282-4-102	Fuel cell technologies - Part 4-102: Fuel cell power systems for electrically powered industrial trucks - Performance test methods (IEC 62282-4-102:2022)
prEN IEC 62282-4-202	Fuel cell technologies - Part 4-202: Fuel cell power system for unmanned aircrafts - Performance test methods
EN IEC 62282-4-600	Fuel cell technologies - Part 4-600: Fuel cell power systems for propulsion other than road vehicles and auxiliary power units (APU) - Fuel cell/battery hybrid systems performance test methods for excavators (IEC 62282-4-600:2022)
EN IEC 62282-5-100	Fuel cell technologies - Part 5-100: Portable fuel cell power systems - Safety (IEC 62282-5-100:2018)
prEN 62282-6-1	Fuel cell technologies - Part 6-1: Micro fuel cell systems - Safety
EN 62282-6-100	Fuel cell technologies - Part 6-1: Micro fuel cell systems - Safety (IEC 62282-6-100:2010)
EN 62282-6-100/A1	Fuel cell technologies - Part 6-1: Micro fuel cell systems - Safety (IEC 62282-6-100:2010/A1:2012)
prEN IEC 62282-6-101	Fuel cell technologies - Part 6-101: Micro fuel cell power systems - Safety - General requirements
prEN IEC 62282-6-106	Fuel cell technologies - Part 6-106: Micro fuel cell power systems - Safety - Indirect Class 8 (corrosive) compounds
prEN IEC 62282-6-107	Fuel cell technologies - Part 6-107: Micro fuel cell power systems - Safety - Indirect water-reactive (Division 4.3) compounds
EN 62282-6-200	Fuel cell technologies - Part 6-200: Micro fuel cell power systems - Performance test methods (IEC 62282-6-200:2016)
EN 62282-6-300	Fuel cell technologies - Part 6-300: Micro fuel cell power systems - Fuel cartridge interchangeability (IEC 62282-6-300:2012)
EN IEC 62282-6-400	Fuel cell technologies - Part 6-400: Micro fuel cell power systems - Power and data interchangeability (IEC 62282-6-400:2019)
prEN IEC 62282-6-401	Fuel cell technologies - Part 6-401: Micro fuel cell power systems - Power and data interchangeability - Performance test methods for laptop computers
EN IEC 62282-7-2	Fuel cell technologies - Part 7-2: Test methods - Single cell and stack performance tests for solid oxide fuel cells (SOFCs) (IEC 62282-7-2:2021)



EN IEC 62282-8-101	Fuel cell technologies - Part 8-101: Energy storage systems using fuel cell modules in reverse mode - Test procedures for the performance of solid oxide single cells and stacks, including reversible operation (IEC 62282-8-101:2020)
EN IEC 62282-8-102	Fuel cell technologies - Part 8-102: Energy storage systems using fuel cell modules in reverse mode - Test procedures for the performance of single cells and stacks with proton exchange membranes, including reversible operation (IEC 62282-8-102:2019)
EN IEC 62282-8-201	Fuel cell technologies - Part 8-201: Energy storage systems using fuel cell modules in reverse mode - Test procedures for the performance of power-to-power systems (IEC 62282-8-201:2020)
FprEN IEC 62282-8-301	Fuel cell technologies - Part 8-301: Energy storage systems using fuel cell modules in reverse mode - Power-to-methane energy systems based on solid oxide cells including reversible operation - Performance test methods
EN IEC 62933-1	Electrical Energy Storage (EES) systems - Part 1: Vocabulary (IEC 62933-1:2018)
EN IEC 62933-2-1	Electrical energy storage (EES) systems - Part 2-1: Unit parameters and testing methods - General specification (IEC 62933-2-1:2017)
EN IEC 62933-2-1/AC	Electrical energy storage (EES) systems - Part 2-1: Unit parameters and testing methods - General specification (IEC 62933-2-1:2017/COR1:2019)
prEN IEC 62933-4-2	Electric Energy Storage Systems - Part 4-2: Assessment of the environmental impact of battery failure in an electrochemical based storage system
prEN IEC 62933-4-4	Electrical energy storage (EES) systems - Part 4-4: Standard on environmental issues battery-based energy storage systems (BESS) with reused batteries - Requirements
EN IEC 62933-5-2	Electrical energy storage (EES) systems - Part 5-2: Safety requirements for grid-integrated EES systems - Electrochemical- based systems (IEC 62933-5-2:2020)
prEN IEC 62933-5-3	Electrical energy storage (EES) systems Part 5-3: Safety requirements when performing unplanned modification of electrochemical based EES systems
EN 50470-1	Electricity metering equipment (a.c.) - Part 1: General requirements, tests and test conditions - Metering equipment (class indexes A, B, and C)
EN 50470-1/A1	Electricity metering equipment (a.c.) - Part 1: General requirements, tests and test conditions - Metering equipment (class indexes A, B and C)
EN 50470-2	Electricity metering equipment (a.c.) - Part 2: Particular requirements - Electromechanical meters for active energy (class indexes A and B)
EN 50470-2/A1	Electricity metering equipment (a.c.) - Part 2: Particular requirements - Electromechanical meters for active energy (class indexes A and B)
EN 50470-3	Electricity metering equipment - Part 3: Particular requirements - Static meters for AC active energy (class indexes A, B and C)
FprEN 50470-4	Electricity metering equipment - Part 4: Particular requirements - Static meters for DC active energy (class indexes A, B and C)
EN 50604-1	Secondary lithium batteries for light EV (electric vehicle) applications - Part 1: General safety requirements and test methods
EN 50604-1/A1	Secondary lithium batteries for light EV (electric vehicle) applications - Part 1: General safety requirements and test methods
EN 61982-4	Secondary batteries (except lithium) for the propulsion of electric road vehicles - Part 4: Safety requirements of nickel-metal hydride cells and modules (IEC 61982-4:2015)
EN IEC 62485-5	Safety requirements for secondary batteries and battery installations - Part 5: Safe operation of stationary lithium ion batteries (IEC 62485-5:2020)
EN IEC 62485-5/AC	Safety requirements for secondary batteries and battery installations - Part 5: Safe operation of stationary lithium ion batteries (IEC 62485-5:2020/COR1:2022)
EN IEC 62660-1	Secondary lithium-ion cells for the propulsion of electric road vehicles - Part 1: Performance testing (IEC 62660-1:2018)
EN IEC 62660-2	Secondary lithium-ion cells for the propulsion of electric road vehicles - Part 2: Reliability and abuse testing (IEC 62660-2:2018)
EN IEC 62660-3	Secondary lithium-ion cells for the propulsion of electric road vehicles - Part 3: Safety requirements (IEC 62660-3:2022)
EN 50272-3	Safety requirements for secondary batteries and battery installations - Part 3: Traction batteries
EN 50272-3/AC	Safety requirements for secondary batteries and battery installations - Part 3: Traction batteries
EN 50696	Contact Interface for Automated Connection Device

EN IEC 62196-1	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 1: General requirements (IEC 62196-1:2022)
EN IEC 62196-2	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 2: Dimensional compatibility requirements for AC pin and contact-tube accessories (IEC 62196-2:2022)
EN IEC 62196-3	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 3: Dimensional compatibility requirements for DC and AC/DC pin and contact-tube vehicle couplers (IEC 62196-3:2022)
EN IEC 62196-6	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 6: Dimensional compatibility requirements for DC pin and contact-tube vehicle couplers intended to be used for DC EV supply equipment where protection relies on electrical separation (IEC 62196-6:2022)
EN 60079-11	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i" (IEC 60079-11:2011)
CLC/TR 50427	Assessment of inadvertent ignition of flammable atmospheres by radio-frequency radiation - Guide
EN 50495	Safety devices required for the safe functioning of equipment with respect to explosion risks
EN IEC 60079-0	Explosive atmospheres - Part 0: Equipment - General requirements (IEC 60079-0:2017)
EN IEC 60079-0/AC	Explosive atmospheres - Part 0: Equipment - General requirements (IEC 60079-0:2017/COR1:2020)
EN IEC 60079-10-1	Explosive atmospheres - Part 10-1: Classification of areas - Explosive gas atmospheres (IEC 60079-10-1:2020)
EN 60079-10-2	Explosive atmospheres - Part 10-2: Classification of areas - Explosive dust atmospheres (IEC 60079-10-2:2015)
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EN 60079-13	Explosive atmospheres - Part 13: Equipment protection by pressurized room "p" and artificially ventilated room "v" (IEC 60079-13:2017)
EN 60079-14/AC	Explosive atmospheres - Part 14: Electrical installations design, selection and erection (IEC 60079-14:2013/COR1:2016)
prEN IEC 60079-14	Explosive atmospheres - Part 14: Electrical installations design, selection and installation of equipment, including initial inspection
EN IEC 60079-15	Explosive atmospheres - Part 15: Equipment protection by type of protection "n" (IEC 60079-15:2017)
EN IEC 60079-15/prAA	Explosive atmospheres - Part 15: Equipment protection by type of protection "n"
prEN IEC 60079-17	Explosive atmospheres - Part 17: Electrical installations inspection and maintenance
EN 60079-18	Explosive atmospheres - Part 18: Equipment protection by encapsulation "m" (IEC 60079-18:2014)
EN 60079-18/AC	Explosive atmospheres - Part 18: Equipment protection by encapsulation "m" (IEC 60079-18:2014/COR1:2018)
EN 60079-18/A1	Explosive atmospheres - Part 18: Equipment protection by encapsulation "m" (IEC 60079-18:2014/A1:2017)
EN IEC 60079-19	Explosive atmospheres - Part 19: Equipment repair, overhaul and reclamation (IEC 60079-19:2019)
EN 60079-2	Explosive atmospheres - Part 2: Equipment protection by pressurized enclosure "p" (IEC 60079-2:2014)
prEN IEC 60079-2	Explosive atmospheres - Part 2: Equipment protection by pressurized enclosure "p"
EN IEC 60079-25	Explosive atmospheres - Part 25: Intrinsically safe electrical systems (IEC 60079-25:2020 + COR1:2020)
EN IEC 60079-25/AC	Explosive atmospheres - Part 25: Intrinsically safe electrical systems (IEC 60079-25:2020/COR2:2022)
EN 60079-26	Explosive atmospheres - Part 26: Equipment with Equipment Protection Level (EPL) Ga (IEC 60079-26:2014)
EN 60079-28	Explosive atmospheres - Part 28: Protection of equipment and transmission systems using optical radiation (IEC 60079-28:2015)
EN 60079-29-1/A11	Explosive atmospheres - Part 29-1: Gas detectors - Performance requirements of detectors for flammable gases
EN 60079-30-1	Explosive atmospheres - Part 30-1: Electrical resistance trace heating - General and testing requirements (IEC/IEEE 60079-30-1:2015, modified)



EN 60079-30-2	Explosive atmospheres - Part 30-2: Electrical resistance trace heating - Application guide for design, installation and maintenance (IEC/IEEE 60079-30-2:2015, modified)
EN 60079-31	Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t" (IEC 60079-31:2013)
CLC/TR 60079-32-1	Explosive atmospheres - Part 32-1: Electrostatic hazards, guidance (IEC/TS 60079-32-1:2013, IEC/TS 60079-32-1:2013/A1:2017)
EN 60079-32-2	Explosive atmospheres - Part 32-2: Electrostatics hazards - Tests (IEC 60079-32-2:2015)
CLC/TR 60079-33	Explosive atmospheres - Part 33: Equipment protection by special protection "s" (IEC 60079-33:2012)
CLC IEC/TS 60079-39	Explosive atmospheres - Part 39: Intrinsically safe systems with electronically controlled spark duration limitation (IEC/TS 60079-39:2015)
CLC IEC/TS 60079-39/AC	Explosive atmospheres - Part 39: Intrinsically safe systems with electronically controlled spark duration limitation (IEC/TS 60079-39:2015/COR1:2020)
CLC IEC/TS 60079-43	Explosive atmospheres - Part 43: Equipment in adverse service conditions (IEC/TS 60079-43:2017)
CLC IEC/TS 60079-47	Explosive atmospheres - Part 47: Equipment protection by 2-wire intrinsically safe Ethernet concept (2-WISE) (IEC/TS 60079-47:2021)
EN 60079-5	Explosive atmospheres - Part 5: Equipment protection by powder filling "q" (IEC 60079-5:2015)
EN 60079-6/FprA1	Amendment 1 - Explosive atmospheres - Part 6: Equipment protection by liquid immersion "o"
EN 60079-7	Explosive atmospheres - Part 7: Equipment protection by increased safety "e" (IEC 60079-7:2015)
EN IEC 63119-1	Information exchange for electric vehicle charging roaming service - Part 1: General (IEC 63119-1:2019)
CLC/TS 50457-2	Conductive charging for electric vehicles - Part 2: Communication protocol between off-board charger and electric vehicle
EN 61851-23	Electric vehicle conductive charging system - Part 23: D.C electric vehicle charging station (IEC 61851-23:2014)
EN 61851-23/AC	Electric vehicle conductive charging system - Part 23: DC electric vehicle charging station (IEC 61851-23:2014/COR1:2016)
EN 61851-24	Electric vehicle conductive charging system - Part 24: Digital communication between a dc EV charging station and an electric vehicle for control of d.c. charging (IEC 61851-24:2014)
EN IEC 61851-1	Electric vehicle conductive charging system - Part 1: General requirements (IEC 61851-1:2017)
EN 61851-21-1	Electric vehicle conductive charging system - Part 21-1: Electric vehicle on-board charger EMC requirements for conductive connection to an AC/DC supply (IEC 61851-21-1:2017)
EN 61851-21-1/AC	Electric vehicle conductive charging system - Part 21-1: Electric vehicle on-board charger EMC requirements for conductive connection to an AC/DC supply (IEC 61851-21-1:2017)
EN IEC 61851-21-2	Electric vehicle conductive charging system - Part 21-2: Electric vehicle requirements for conductive connection to an AC/DC supply - EMC requirements for off board electric vehicle charging systems (IEC 61851-21-2:2018)
EN 61851-22	Electric vehicle conductive charging system - Part 22: AC electric vehicle charging station (IEC 61851-22:2001)
prEN IEC 61851-23-1	Electric vehicle conductive charging system - Part 23-1: DC electric vehicle charging station with an automated connection device
EN IEC 61851-25	Electric vehicle conductive charging system - Part 25: DC EV supply equipment where protection relies on electrical separation (IEC 61851-25:2020)
EN IEC 61980-1	Electric vehicle wireless power transfer (WPT) systems - Part 1: General requirements (IEC 61980-1:2020)
EN IEC 61980-2	Electric vehicle wireless power transfer (WPT) systems - Part 2: Specific requirements for MF-WPT system communication and activities (IEC 61980-2:2023)
EN IEC 61980-3	Electric vehicle wireless power transfer (WPT) systems - Part 3: Specific requirements for magnetic field wireless power transfer systems (IEC 61980-3:2022)
EN IEC 62840-2	Electric vehicle battery swap system - Part 2: Safety requirements (IEC 62840-2:2016)

<b>EN IEC 63110-1</b>	Protocol for management of electric vehicles charging and discharging infrastructures - Part 1: Basic definitions, use cases and architectures (IEC 63110-1:2022)
<b>EN IEC 63119-2</b>	Information exchange for electric vehicle charging roaming service - Part 2: Use cases (IEC 63119-2:2022)
<b>EUV 582/2011*EUReg 582/2011*UEReg 582/2011</b>	Commission Regulation (EU) No 582/2011 of 25 May 2011 implementing and amending Regulation (EC) No 595/2009 of the European Parliament and of the Council with respect to emissions from heavy duty vehicles (Euro VI) and amending Annexes I and III to Directive 2007/46/EC of the European Parliament and of the Council
<b>EUV 459/2012*EUReg 459/2012*UEReg 459/2012</b>	Commission Regulation (EU) No 459/2012 of 29 May 2012 amending Regulation (EC) No 715/2007 of the European Parliament and of the Council and Commission Regulation (EC) No 692/2008 as regards emissions from light passenger and commercial vehicles (Euro 6)
<b>EUV 136/2014*EUReg 136/2014*UEReg 136/2014</b>	Commission Regulation (EU) No 136/2014 of 11 February 2014 amending Directive 2007/46/EC of the European Parliament and of the Council, Commission Regulation (EC) No 692/2008 as regards emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and Commission Regulation (EU) No 582/2011 as regards emissions from heavy duty vehicles (Euro VI)
<b>EUV 2017/1151*EUReg 2017/1151*UEReg 2017/1151</b>	Commission Regulation (EU) 2017/1151 of 1 June 2017 supplementing Regulation (EC) No 715/2007 of the European Parliament and of the Council on type-approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information, amending Directive 2007/46/EC of the European Parliament and of the Council, Commission Regulation (EC) No 692/2008 and Commission Regulation (EU) No 1230/2012 and repealing Commission Regulation (EC) No 692/2008
<b>EUV 2017/1154*EUReg 2017/1154*UEReg 2017/1154</b>	Commission Regulation (EU) 2017/1154 of 7 June 2017 amending Regulation (EU) 2017/1151 supplementing Regulation (EC) No 715/2007 of the European Parliament and of the Council on type-approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information, amending Directive 2007/46/EC of the European Parliament and of the Council, Commission Regulation (EC) No 692/2008 and Commission Regulation (EU) No 1230/2012 and repealing Regulation (EC) No 692/2008 and Directive 2007/46/EC of the European Parliament and of the Council as regards real-driving emissions from light passenger and commercial vehicles (Euro 6)
<b>EUV 2017/1347*EUReg 2017/1347*UEReg 2017/1347</b>	Commission Regulation (EU) 2017/1347 of 13 July 2017 correcting Directive 2007/46/EC of the European Parliament and of the Council, Commission Regulation (EU) No 582/2011 and Commission Regulation (EU) 2017/1151 supplementing Regulation (EC) No 715/2007 of the European Parliament and of the Council on type-approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information, amending Directive 2007/46/EC of the European Parliament and of the Council, Commission Regulation (EC) No 692/2008 and Commission Regulation (EU) No 1230/2012 and repealing Regulation (EC) No 692/2008
<b>EUV 2017/2400*EUReg 2017/2400*UEReg 2017/2400</b>	Commission Regulation (EU) 2017/2400 of 12 December 2017 implementing Regulation (EC) No 595/2009 of the European Parliament and of the Council as regards the determination of the CO <sub>2</sub> emissions and fuel consumption of heavy-duty vehicles and amending Directive 2007/46/EC of the European Parliament and of the Council and Commission Regulation (EU) No 582/2011
<b>EUV 2018/1832*EUReg 2018/1832*UEReg 2018/1832</b>	Commission Regulation (EU) 2018/1832 of 5 November 2018 amending Directive 2007/46/EC of the European Parliament and of the Council, Commission Regulation (EC) No 692/2008 and Commission Regulation (EU) 2017/1151 for the purpose of improving the emission type approval tests and procedures for light passenger and commercial vehicles, including those for in-service conformity and real-driving emissions and introducing devices for monitoring the consumption of fuel and electric energy
<b>EUV 2019/318*EUReg 2019/318*UEReg 2019/318</b>	Commission Regulation (EU) 2019/318 of 19 February 2019 amending Regulation (EU) 2017/2400 and Directive 2007/46/EC of the European Parliament and of the Council as regards the determination of the CO <sub>2</sub> emissions and fuel consumption of heavy-duty vehicles

<b>EGV 595/2009*ECR 595/2009*CEReg 595/2009</b>	Regulation (EC) No 595/2009 of the European Parliament and of the Council of 18 June 2009 on type-approval of motor vehicles and engines with respect to emissions from heavy duty vehicles (Euro VI) and on access to vehicle repair and maintenance information and amending Regulation (EC) No 715/2007 and Directive 2007/46/EC and repealing Directives 80/1269/EEC, 2005/55/EC and 2005/78/EC
<b>VDE-AR-E 2122-1000</b>	Standard interface for charging points/charging stations for connection to local power and energy management
<b>DIN EN 50325-1</b>	Industrial communications subsystem based on ISO 11898 (CAN) for controller-device interfaces - Part 1: General requirements; English version EN 50325-1:2019
<b>DIN EN IEC 61139-2</b>	Industrial networks - Single-drop digital communication interface - Part 2: Functional safety extensions (IEC 61139-2:2022); English version EN IEC 61139-2:2022
<b>DIN IEC/TS 62351-100-4*VDE V 0112-351-100-4</b>	Power systems management and associated information exchange - Data and communication security - Part 100-4: Cybersecurity conformance testing for IEC 62351-4 (IEC 57/2505/DTS:2022); Text in German and English
<b>DIN VDE V 0122-2-300*VDE V 0122-2-300</b>	Conformance Test Specification IEC 61851-23, Annex CC; Text german and english
<b>VDE-AR-E 2283-5</b>	Requirements for charging cables for electric vehicles and plug-in hybrid vehicles
<b>VDE-AR-E 2532-100</b>	Requirements for an authentication for the use of electric mobility supply systems
<b>VDE-AR-E 2802-100-1</b>	Handling of certificates for electric vehicles, charging infrastructure and backend systems within the framework of ISO 15118
<b>DIN EN 50470-4*VDE 0418-0-4</b>	Electricity metering equipment - Part 4: Particular requirements - Static meters for DC active energy (class indexes A, B, C); German and English version prEN 50470-4:2022
<b>DIN EN 50620*VDE 0285-620</b>	Electric cables - Charging cables for electric vehicles; German version EN 50620:2017 + A1:2019
<b>DIN EN 50620/A2*VDE 0285- 620/A2</b>	Electric cables - Charging cables for electric vehicles; German and English version EN 50620:2017/prA2:2021
<b>DIN CLC/TS 50717*VDE V 0115- 717</b>	Technical Requirements for Current Collectors for ground-level feeding system on road vehicles in operation; German version CLC/TS 50717:2022
<b>DIN EN 61000-3-3*VDE 0838-3</b>	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current $\leq 16$ A per phase and not subject to conditional connection (IEC 61000-3-3:2013 + A1:2017 + A2:2021 + A2:2021/COR1:2022); German version EN 61000-3-3:2013 + A1:2019 + A2:2021 + A2:2021/AC:2022
<b>DIN EN 61000-3-3 Beiblatt 1*VDE 0838-3 Beiblatt 1</b>	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current $\leq 16$ A per phase and not subject to conditional connection; Supplement 1: Information for the interpretation of DIN EN 61000-3-3 (VDE 0838-3)
<b>DIN EN IEC 61000-6-3*VDE 0839-6- 3</b>	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for equipment in residential environments (IEC 61000-6-3:2020); German version EN IEC 61000-6-3:2021
<b>DIN EN 61851-23-1*VDE 0122-2-31</b>	Electric vehicle conductive charging system - Part 23-1: DC Charging with an automatic connection system (IEC 69/495/CD:2017)
<b>DIN CLC IEC/TS 61851-3-1*VDE V 0122-3-1</b>	Electric Vehicles conductive power supply system - Part 3-1: DC EV supply equipment where protection relies on double or reinforced insulation - General rules and requirements for stationary equipment (IEC 69/845/DTS:2022); Text in German and English
<b>DIN CLC IEC/TS 61851-3-2*VDE V 0122-3-2</b>	Electric Vehicles conductive power supply system - Part 3-2: DC EV supply equipment where protection relies on double or reinforced insulation - Particular requirements for portable and mobile equipment (IEC 69/846/DTS:2022); Text in German and English
<b>DIN IEC/TS 61851-3-4*VDE V 0122- 3-4</b>	Electric Vehicles Conductive Power Supply System - Part 3-4: Requirements for Light Electric Vehicles (LEV) communication - General definitions and EMSC (IEC 69/373/CD:2014)
<b>DIN IEC/TS 61851-3-5*VDE V 0122- 3-5</b>	Electric Vehicles Conductive Power Supply System - Part 3-5: Requirements for Light Electric Vehicles (LEV) communication - Pre-defined communication parameters (IEC 69/374/CD:2015)
<b>DIN IEC/TS 61851-3-6*VDE V 0122- 3-6</b>	Electric Vehicles Conductive Power Supply System - Part 3-6: Requirements for Light Electric Vehicles (LEV) communication - Voltage converter unit (IEC 69/375/CD:2015)

<b>DIN IEC/TS 61851-3-7*VDE V 0122-3-7</b>	Electric Vehicles Conductive Power Supply System - Part 3-7: Requirements for Light Electric Vehicles (LEV) communication - Battery system (IEC 69/376/CD:2015)
<b>DIN EN 61982*VDE 0510-32</b>	Secondary batteries (except lithium) for the propulsion of electric road vehicles - Performance and endurance tests (IEC 61982:2012); German version EN 61982:2012
<b>DIN EN IEC 62619*VDE 0510-39</b>	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries, for use in industrial applications (IEC 62619:2022); German version EN IEC 62619:2022
<b>DIN EN IEC 62752*VDE 0666-10</b>	In-cable control and protection device for mode 2 charging of electric road vehicles (IC-CPD) (IEC 23E/1212/CD:2020); Text in German and English
<b>DIN EN IEC 62764-1*VDE 0848-764-1</b>	Measurement procedures of magnetic field levels generated by electronic and electrical equipment in the automotive environment with respect to human exposure - Part 1: Low-frequency magnetic fields (IEC 62764-1:2022); German version EN IEC 62764-1:2022
<b>DIN IEC/TR 62933-4-200*VDE 0520-933-4-200</b>	Electrical Energy Storage (EES) systems - Part 4-200: Guidance on environmental issues - Greenhouse gas (GHG) emission reduction by electrical energy storage (EES) systems (IEC 120/151/CD:2019); Text in German and English
<b>IEV 485</b>	International Electrotechnical Vocabulary - Part 485: Fuel cell technologies - Section 485-01: Catalyst; Authorized translation of IEC 60050-485:2020-02
<b>DIN IEC/TS 62282-1*VDE V 0130-1</b>	Fuel cell technologies - Part 1: Terminology (IEC/TS 62282-1:2013)
<b>DIN EN IEC 62282-6-101*VDE 0130-6-101</b>	Fuel cell technologies - Part 6-101: Micro fuel cell power systems - Safety - General requirements (IEC 105/807/CD:2020); Text in German and English
<b>DIN EN IEC 62282-6-106*VDE 0130-6-106</b>	Fuel cell technologies - Part 6-106: Micro fuel cell power systems - Safety - Indirect Class 8 (corrosive) compounds (IEC 105/808/CD:2020); Text in German and English
<b>DIN EN IEC 62282-6-107*VDE 0130-6-107</b>	Fuel cell technologies - Part 6-107: Micro fuel cell power systems - Safety - Indirect water-reactive (Division 4.3) compounds (IEC 105/809/CD:2020); Text in German and English
<b>DIN EN IEC 62282-6-401*VDE 0130-6-401</b>	Fuel cell technologies - Part 6-401: Micro fuel cell power systems - Power and data interchangeability - Performance test methods for laptop computers (IEC 105/902/CDV:2022); German and English version prEN IEC 62282-6-401:2022
<b>DIN VDE 0105-7*VDE 0105-7</b>	Operation of electrical installations - Supplementary requirements for areas endangered by substances with explosive characteristics
<b>DIN EN 61010-1*VDE 0411-1</b>	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements (IEC 61010-1:2010 + COR:2011 + A1:2016, modified + A1:2016/COR1:2019); German version EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019
<b>DIN EN 61010-1 Berichtigung 1*VDE 0411-1 Berichtigung 1</b>	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements (IEC 61010-1:2010 + COR:2011 + A1:2016, modified + A1:2016/COR1:2019); German version EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019; Corrigendum 1
<b>DIN EN 61010-1 Berichtigung 2*VDE 0411-1 Berichtigung 2</b>	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements (IEC 61010-1:2010 + COR:2011 + A1:2016, modified + A1:2016/COR1:2019); German version EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019; Corrigendum 2
<b>DIN EN IEC 61010-2-201 Berichtigung 1*VDE 0411-2-201 Berichtigung 1</b>	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-201: Particular requirements for control equipment (IEC 61010-2-201:2017); German version EN IEC 61010-2-201:2018; Corrigendum 1
<b>DIN EN 61508 Beiblatt 1*VDE 0803 Beiblatt 1</b>	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 0: Functional safety and IEC 61508 (IEC/TR 61508-0:2005)
<b>DIN EN 61508-1*VDE 0803-1</b>	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 1: General requirements (IEC 61508-1:2010); German version EN 61508-1:2010
<b>DIN EN 61508-2*VDE 0803-2</b>	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems (IEC 61508-2:2010); German version EN 61508-2:2010
<b>DIN EN 61508-3*VDE 0803-3</b>	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 3: Software requirements (IEC 61508-3:2010); German version EN 61508-3:2010
<b>DIN EN 61508-4*VDE 0803-4</b>	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 4: Definitions and abbreviations (IEC 61508-4:2010); German version EN 61508-4:2010

<b>DIN EN 61508-5*VDE 0803-5</b>	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 5: Examples of methods for the determination of safety integrity levels (IEC 61508-5:2010); German version EN 61508-5:2010
<b>DIN EN 61508-6*VDE 0803-6</b>	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 6: Guidelines on the application of IEC 61508-2 and IEC 61508-3 (IEC 61508-6:2010); German version EN 61508-6:2010
<b>DIN EN 61508-7*VDE 0803-7</b>	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 7: Overview of techniques and measures (IEC 61508-7:2010); German version EN 61508-7:2010
<b>DIN EN 61982-4*VDE 0510-43</b>	Secondary batteries (except lithium) for the propulsion of electric road vehicles - Part 4: Safety requirements of nickel-metal hydride cells and modules (IEC 61982-4:2015); German version EN 61982-4:2016
<b>DIN EN 62477-1*VDE 0558-477-1</b>	Safety requirements for power electronic converter systems and equipment - Part 1: General (IEC 62477-1:2012 + A1:2016); German version EN 62477-1:2012 + A11:2014 + A1:2017
<b>DIN EN IEC 62485-1*VDE 0510-485-1</b>	Safety requirements for secondary batteries and battery installations - Part 1: General safety information (IEC 62485-1:2015); German version EN IEC 62485-1:2018
<b>DIN EN 62485-3*VDE 0510-47</b>	Safety requirements for secondary batteries and battery installations - Part 3: Traction batteries (IEC 62485-3:2014); German version EN 62485-3:2014
<b>DIN EN IEC 63366</b>	Product category rules for life cycle assessment of electrical and electronic products and systems (IEC 111/646/CD:2021); Text in German and English
<b>DIN CLC/TS 50717*VDE V 0115-717</b>	Technical Requirements for Current Collectors for ground-level feeding system on road vehicles in operation; German version CLC/TS 50717:2022
<b>DIN SPEC 92001-1</b>	Artificial Intelligence - Life Cycle Processes and Quality Requirements - Part 1: Quality Meta Model; Text in English
<b>DIN SPEC 91286</b>	Electric mobility - Schemes of identifiers for E-Roaming - Contract ID and Electric Vehicle Supply Equipment ID; Text in English
<b>DVGW G 407</b>	Conversion of Gas Pipelines made of Steel Pipes for the Distribution of Hydrogen-containing High-Methane Gases and Hydrogen up to 16 bar Operating Pressure
<b>DVGW G 408</b>	Conversion of Gas Pipelines made of Plastic Pipes for the Distribution of Hydrogen-containing High-Methane Gases and Hydrogen up to 16 bar Operating Pressure
<b>DVGW G 498</b>	Pressure Vessels in Pipelines and Installations for the Pipeline Bound Supply of Gas and Hydrogen to the General Public
<b>DVGW G 655</b>	Guideline H2-Readiness Gas Utilisation
<b>DVGW-Information Gas Nr. 29</b>	Erläuterungen zum Begriff "H2-ready" für Gasversorgungsnetze und Gasanwendungen nach DVGW-Regelwerk
<b>DVGW G 265-3</b>	Plants for the Injection of Hydrogen in Gas- and Hydrogen Grids - Design, Manufacture, Construction, Testing, Commissioning and Operation
<b>DVGW G 640-2</b>	Installation of fully packaged Fuel Cell Gas Heat Appliances
<b>DVGW G 1001</b>	Safety of Gas and Hydrogen Supply - Risk Management of Gas Infrastructures in Normal Operation
<b>DVGW G 1002</b>	Safety of Gas and Hydrogen Supply - Organisation and Management in Crisis
<b>VG 97010-1</b>	Generic fuel cell - Text in German and English
<b>VG 97010-2*Def Stan 61-23 Supp 01</b>	Generic fuel cell - Part 2: Methanol Fuel Cell System; Text in German and English
<b>ETSI TR 103787-1 V 1.1.1</b>	CYBER - Cybersecurity for SMEs - Part 1: Cybersecurity Standardization Essentials
<b>ETSI GR MEC 018 V 1.1.1</b>	Mobile Edge Computing (MEC) - End to End Mobility Aspects
<b>ETSI GR SAI 004 V 1.1.1</b>	Securing Artificial Intelligence (SAI) - Problem Statement
<b>ETSI GR SAI 007 V 1.1.1</b>	Securing Artificial Intelligence (SAI) - Explicability and transparency of AI processing
<b>ETSI TS 103544-1 V 1.3.1</b>	Publicly Available Specification (PAS) - Intelligent Transport Systems (ITS) - MirrorLink® - Part 1: Connectivity
<b>ETSI TS 103544-18 V 1.3.1</b>	Publicly Available Specification (PAS) - Intelligent Transport Systems (ITS) - MirrorLink® - Part 18: IEEE 802.11TM Car Connectivity Consortium (CCC) Information Element
<b>ETSI TS 103544-2 V 1.3.1</b>	Publicly Available Specification (PAS) - Intelligent Transport Systems (ITS) - MirrorLink® - Part 2: Virtual Network Computing (VNC) based Display and Control
<b>ETSI TS 101556-1 V 1.1.1</b>	Intelligent Transport Systems (ITS) - Infrastructure to Vehicle Communication - Electric Vehicle Charging Spot Notification Specification
<b>DIN SPEC 91474</b>	Data format for the exchange of LCA results for the configuration of modular variant-rich products



VDE-AR-N 4100	Technical rules for the connection and operation of customer installations to the low voltage network (TCR low voltage)
VDE-AR-N 4100 Berichtigung 1	Technical rules for the connection and operation of customer installations to the low voltage network (TAR low voltage); Corrigendum 1
VDE-AR-N 4105	Generators connected to the low-voltage distribution network - Technical requirements for the connection to and parallel operation with low-voltage distribution networks
VDE-AR-N 4105 Berichtigung 1	Generators connected to the low-voltage distribution network - Technical requirements for the connection to and parallel operation with low-voltage distribution networks; Corrigendum 1
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DIN EN 1594	Gas infrastructure - Pipelines for maximum operating pressure over 16 bar - Functional requirements; German and English version prEN 1594:2022
DIN EN 17928-1	Gas infrastructure - Injection stations - Part 1: General requirements; German and English version prEN 17928-1:2023
DIN EN 17928-3	Gas infrastructure - Injection station - Part 3: Specific requirements regarding the injection of hydrogen fuel gas; German and English version prEN 17928-3:2023
DIN EN ISO 19884	Gaseous hydrogen - Cylinders and tubes for stationary storage (ISO/DIS 19884:2018); German and English version prEN ISO 19884:2018
DIN EN 17649	Gas infrastructure - Safety Management System (SMS) and Pipeline Integrity Management System (PIMS) - Functional requirements; German version EN 17649:2022
IEC 63115-1*CEI 63115-1	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Sealed nickel-metal hydride cells and batteries for use in industrial applications - Part 1: Performance
IEC 63115-1 Edition 1.1*CEI 63115-1 Edition 1.1	Secondary cells and batteries containing alkaline or other non-acid electrolytes Sealed nickel-metal hydride cells and batteries for use in industrial applications - Part 1: Performance
IEC 63115-2*CEI 63115-2	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Sealed nickel-metal hydride cells and batteries for use in industrial applications - Part 2: Safety
IEC 21A/805/CD*CEI 21A/805/CD*IEC 63369-1*CEI 63369-1	Methodology for the Carbon Footprint calculation applicable to Lithium-ion batteries
IEC 62909-2*CEI 62909-2	Bi-directional grid-connected power converters - Part 2: Interface of GCPC and distributed energy resources
IEC 23H/484/DPAS*CEI 23H/484/DPAS*IEC/PAS 63386*CEI/PAS 63386	IEC/PAS: Conductive charging of electric vehicle - AC vehicle coupler type 4
IEC 23H/527/CD*CEI 23H/527/CD*IEC/TS 62196-7*CEI/TS 62196-7	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 7: Vehicle adapter
IEC 23H/529/CD*CEI 23H/529/CD*IEC/TS 63379*CEI/TS 63379	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Vehicle connector, vehicle inlet and cable assembly for Megawatt DC charging
IEC 23H/534/CD*CEI 23H/534/CD*IEC 62196-1*CEI 62196-1	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 1: General requirements
IEC 23H/535/CD*CEI 23H/535/CD*IEC 62196-3*CEI 62196-3	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 3: Dimensional compatibility requirements for DC and AC/DC pin and contact-tube vehicle couplers
IEC 23H/536/CD*CEI 23H/536/CD*IEC 62196-2*CEI 62196-2	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 2: Dimensional compatibility requirements for AC pin and contact-tube accessories
IEC/TS 62196-3-1*CEI/TS 62196-3-1	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 3-1: Vehicle connector, vehicle inlet and cable assembly for DC charging intended to be used with a thermal management system
IEC/TS 62196-4*CEI/TS 62196-4	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 4: Dimensional compatibility and interchangeability requirements for DC pin and contact-tube accessories for Class II or Class III applications

IEC 60050-485*CEI 60050-485	International Electrotechnical Vocabulary (IEV) - Part 485: Fuel cell technologies
IEC 62282-3-400*CEI 62282-3-400	Fuel cell technologies - Part 3-400: Stationary fuel cell power systems - Small stationary fuel cell power system with combined heat and power output
IEC/TS 62282-7-1*CEI/TS 62282-7-1	Fuel cell technologies - Part 7-1: Test methods - Single cell performance tests for polymer electrolyte fuel cells (PEFC)
IEC 62282-8-301*CEI 62282-8-301	Fuel cell technologies - Part 8-301: Energy storage systems using fuel cell modules in reverse mode - Power-to-methane energy systems based on solid oxide cells including reversible operation - Performance test methods
IEC/TS 62282-9-101*CEI/TS 62282-9-101	Fuel cell technologies - Part 9-101: Evaluation methodology for the environmental performance of fuel cell power systems based on life cycle thinking - Streamlined life-cycle considered environmental performance characterization of stationary fuel cell combined heat and power systems for residential applications
IEC/TS 62282-9-102*CEI/TS 62282-9-102	Fuel cell technologies - Part 9-102: Evaluation methodology for the environmental performance of fuel cell power systems based on life cycle thinking - Product category rules for environmental product declarations of stationary fuel cell power systems and alternative systems for residential applications
IEC 105/935/CD*CEI 105/935/CD*IEC 62282-2-400*CEI 62282-2-400	Fuel cell technologies - Part 2-400: Fuel cell modules - Calculation of rated power and power density of a PEM stack and PEM module
IEC 105/941/CDV*CEI 105/941/CDV*IEC 62282-4-202*CEI 62282-4-202	Fuel cell technologies - Part 4-202: Fuel cell power system for unmanned aircrafts - Performance test methods
IEC 105/949/CDV*CEI 105/949/CDV*IEC 62282-6-101*CEI 62282-6-101	Fuel cell technologies - Part 6-101: Micro fuel cell power systems - Safety - General requirements
IEC 105/950/CDV*CEI 105/950/CDV*IEC 62282-6-106*CEI 62282-6-106	Fuel cell technologies - Part 6-106: Micro fuel cell power systems - Safety - Indirect Class 8 (corrosive) compounds
IEC 105/951/CDV*CEI 105/951/CDV*IEC 62282-6-107*CEI 62282-6-107	Fuel cell technologies - Part 6-107: Micro fuel cell power systems - Safety - Indirect water-reactive (Division 4.3) compounds
IEC 105/961/CD*CEI 105/961/CD*IEC 62282-3-202*CEI 62282-3-202	Fuel cell technologies - Part 3-202: Stationary fuel cell power systems - Performance test methods for small fuel cell power systems that can be complemented with a supplementary heat generator for multiple units operation by an energy management system
IEC 105/962/CDV*CEI 105/962/CDV*IEC 62282-8-201*CEI 62282-8-201	Fuel cell technologies - Part 8-201: Energy storage systems using fuel cell modules in reverse mode - Test procedures for the performance of power-to-power systems
IEC 105/974/CD*CEI 105/974/CD*IEC 62282-3-200*CEI 62282-3-200	Fuel cell technologies - Part 3-200: Stationary fuel cell power systems - Performance test methods
IEC 105/975/CD*CEI 105/975/CD*IEC 62282-3-201*CEI 62282-3-201	Fuel cell technologies - Part 3-201: Stationary fuel cell power systems - Performance test methods for small fuel cell power systems
IEC 105/982/CDV*CEI 105/982/CDV*IEC 62282-6-401*CEI 62282-6-401	Fuel cell technologies - Part 6-401: Micro fuel cell power systems - Power and data interchangeability - Performance test methods for laptop computers
IEC 111/668/CD*CEI 111/668/CD*IEC 63372*CEI 63372	Quantification and communication of Carbon FootPRINT and GHG emission reductions/avoided emissions from electric and electronic products and systems - Principles, methodologies, requirements and guidance
IEC 120/279/CD*CEI 120/279/CD*IEC 62933-5-2*CEI 62933-5-2	Electrical energy storage (EES) systems - Part 5-2: Safety requirements for grid-integrated EES systems - Electrochemical-based systems
IEC 120/298/CD*CEI 120/298/CD*IEC 62933-5-1*CEI 62933-5-1	Electrical energy storage (EES) systems - Part 5-1: Safety considerations for grid-integrated EES systems - General specification
IEC 120/301/CDV*CEI 120/301/CDV*IEC 62933-5-3*CEI 62933-5-3	Electrical energy storage (EES) systems Part 5-3: Safety requirements when performing unplanned modification of electrochemical based EES systems
IEC 120/302/CD*CEI 120/302/CD*IEC 62933-1*CEI 62933-1	Electrical energy storage (EES) systems - Part 1: Vocabulary

IEC 120/304/CDV*CEI 120/304/CDV*IEC 62933-4-4*CEI 62933-4-4	Electrical energy storage (EES) systems - Part 4-4: Standard on environmental issues battery-based energy storage systems (BESS) with reused batteries - Requirements
IEC 120/307/CD*CEI 120/307/CD*IEC/TR 62933-4-200*CEI/TR 62933-4-200	Electrical Energy Storage (EES) Systems - Part 4-200: Guidance on environmental issues - Greenhouse gas (GHG) emission assessment by electrical energy storage (EES) systems
IEC 120/316/CDV*CEI 120/316/CDV*IEC 62933-4-2*CEI 62933-4-2	Electric Energy Storage Systems - Part 4-2-: Assessment of the environmental impact of battery failure in an electrochemical based storage system
IEC 120/320/CD*CEI 120/320/CD*IEC/TR 62933-3-200*CEI/TR 62933-3-200	Electrical Energy Storage (EES) Systems - Part 3-200: Design principles of electrochemical based EES systems
IEC/TS 62933-2-2*CEI/TS 62933-2-2	Electrical energy storage (EES) systems - Part 2-2: Unit parameters and testing methods - Application and performance testing
IEC/TR 62933-2-200*CEI/TR 62933-2-200	Electrical energy storage (EES) systems - Part 2-200: Unit parameters and testing methods - Case study of electrical energy storage (EES) systems located in EV charging station with PV
IEC/TS 62933-3-1*CEI/TS 62933-3-1	Electrical energy storage (EES) systems - Part 3-1: Planning and performance assessment of electrical energy storage systems - General specification
IEC/TS 62933-3-2*CEI/TS 62933-3-2	Electrical energy storage (EES) systems - Part 3-2: Planning and performance assessment of electrical energy storage systems - Additional requirements for power intensive and renewable energy sources integration related applications
IEC/TS 62933-3-3*CEI/TS 62933-3-3	Electrical energy storage (EES) systems - Part 3-3: Planning and performance assessment of electrical energy storage systems - Additional requirements for energy intensive and backup power applications
IEC/TS 62933-4-1*CEI/TS 62933-4-1	Electrical energy storage (EES) systems - Part 4-1: Guidance on environmental issues - General specification
IEC/TS 62933-5-1*CEI/TS 62933-5-1	Electrical energy storage (EES) systems - Part 5-1: Safety considerations for grid-integrated EES systems - General specification
IEC 62893-1*CEI 62893-1	Charging cables for electric vehicles of rated voltages up to and including 0,6/1 kV - Part 1: General requirements
IEC 62893-1 Edition 1.1*CEI 62893-1 Edition 1.1	Charging cables for electric vehicles for rated voltages up to and including 0,6/1 KV - Part 1: General requirements
IEC 62893-2*CEI 62893-2	Charging cables for electric vehicles of rated voltages up to and including 0,6/1 kV - Part 2: Test methods
IEC 62485-6*CEI 62485-6	Safety requirements for secondary batteries and battery installations - Part 6: Safe operation of lithium ion batteries in traction applications
IEC/TR 62660-4*CEI/TR 62660-4	Secondary lithium-ion cells for the propulsion of electric road vehicles - Part 4: Candidate alternative test methods for the internal short circuit test of IEC 62660-3
IEC/PAS 63454*CEI/PAS 63454	Conductive charging of electric vehicles - DC vehicle coupler configuration GG
IEC/PAS 63472*CEI/PAS 63472	Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Dimensional compatibility description for configuration FF AC/DC contact-tube vehicle coupler
IEC 57/2505/DTS*CEI 57/2505/DTS*IEC/TS 62351-100-4*CEI/TS 62351-100-4	Power systems management and associated information exchange - Data and communication security - Part 100-4: Cybersecurity conformance testing for IEC 62351-4
IEC/TS 62351-100-6*CEI/TS 62351-100-6	Power systems management and associated information exchange - Data and communication security - Part 100-6: Cybersecurity conformance testing for IEC 61850-8-1 and IEC 61850-9-2
IEC/TR 62357-1*CEI/TR 62357-1	Power systems management and associated information exchange - Part 1: Reference architecture
IEC/TR 61850-90-8*CEI/TR 61850-90-8	Communication networks and systems for power utility automation - Part 90-8: Object model for E-mobility
IEC 60364-7-722*CEI 60364-7-722	Low-voltage electrical installations - Part 7-722: Requirements for special installations or locations - Supplies for electric vehicles
IEC 60479-1*CEI 60479-1	Effects of current on human beings and livestock - Part 1: General aspects
IEC 60479-2*CEI 60479-2	Effects of current on human beings and livestock - Part 2: Special aspects
IEC/TR 60479-4*CEI/TR 60479-4	Effects of current on human beings and livestock - Part 4: Effects of lightning strokes
IEC/TR 60479-5*CEI/TR 60479-5	Effects of current on human beings and livestock - Part 5: Touch voltage threshold values for physiological effects
IEC/TR 60479-5 Corrigendum 1*CEI/TR 60479-5 Corrigendum 1	Effects of current on human beings and livestock - Part 5: Touch voltage threshold values for physiological effects; Corrigendum 1



IEC 63110-1*CEI 63110-1	Protocol for management of electric vehicles charging and discharging infrastructures - Part 1: Basic definitions, use cases and architectures
IEC 69/849A/CD*CEI 69/849A/CD*IEC 63380-1*CEI 63380-1	Local Charging station management systems and Local Energy Management Systems network connectivity and information exchange - Part 1: General Requirements, Use Cases and abstract Messages
IEC 69/851/CD*CEI 69/851/CD*IEC 63110-2*CEI 63110-2	Protocol for Management of Electric Vehicles charging and discharging infrastructures - Part 2: Technical protocol specifications and requirements
IEC 69/877/CD*CEI 69/877/CD*IEC 63380-2*CEI 63380-2	Local Charging station management systems and Local Energy Management Systems network connectivity and information exchange - Part 2: Specific Data Model Mapping
IEC 69/878/CD*CEI 69/878/CD*IEC 63380-3*CEI 63380-3	Local Charging station management systems and Local Energy Management Systems network connectivity and information exchange - Part 3: Communication Protocol and Cybersecurity Specific Aspects
IEC/PAS 61851-1-1*CEI/PAS 61851-1-1	Electric vehicle conductive charging system - Part 1-1: Specific requirements for electric vehicle conductive charging system using type 4 vehicle coupler
IEC/TS 62840-1*CEI/TS 62840-1	Electric vehicle battery swap system - Part 1: General and guidance
IEC 69/650/DTS*CEI 69/650/DTS*IEC/TS 61851-3- 4*CEI/TS 61851-3-4	Electric Vehicles conductive power supply system - Part 3-4: Particular requirements EV supply equipment where protection relies on double or reinforced insulation - General definitions and requirements for CANopen communications
IEC 69/651/DTS*CEI 69/651/DTS*IEC/TS 61851-3- 5*CEI/TS 61851-3-5	Electric Vehicles conductive power supply system - Part 3-5: Particular requirements EV supply equipment where protection relies on double or reinforced insulation - Pre-defined communication parameters and general application objects
IEC 69/652/DTS*CEI 69/652/DTS*IEC/TS 61851-3- 6*CEI/TS 61851-3-6	Electric Vehicles conductive power supply system - Part 3-6: Particular requirements for EV supply equipment where protection relies on double or reinforced insulation - Voltage converter and communication
IEC 69/653/DTS*CEI 69/653/DTS*IEC/TS 61851-3- 7*CEI/TS 61851-3-7	Electric vehicles conductive power supply system - Part 3-7: Particular requirements for EV supply equipment where protection relies on double or reinforced insulation - Battery system communication
IEC 69/701/CDV*CEI 69/701/CDV*IEC 61851-24*CEI 61851-24	Electric vehicle conductive charging system - Part 24: Digital communication between a DC EV charging station and an electric vehicle for control of DC charging
IEC 69/702/CDV*CEI 69/702/CDV*IEC 61851-23*CEI 61851-23	Electric vehicle conductive charging system - Part 23: DC electric vehicle supply equipment
IEC 69/727/CDV*CEI 69/727/CDV*IEC 61851-23-1*CEI 61851-23-1	Electric vehicle conductive charging system - Part 23-1: DC electric vehicle charging station with an automated connection device
IEC 69/796/CDV*CEI 69/796/CDV*IEC 15118-4*CEI 15118-4*ISO 15118-4	Road vehicles - Vehicle to grid communication interface - Part 4: Network and application protocol conformance test
IEC 69/845/DTS*CEI 69/845/DTS*IEC/TS 61851-3- 1*CEI/TS 61851-3-1	Electric Vehicles conductive power supply system - Part 3-1: DC EV supply equipment where protection relies on double or reinforced insulation - General rules and requirements for stationary equipment
IEC 69/846/DTS*CEI 69/846/DTS*IEC/TS 61851-3- 2*CEI/TS 61851-3-2	Electric Vehicles conductive power supply system - Part 3-2: DC EV supply equipment where protection relies on double or reinforced insulation - Particular requirements for portable and mobile equipment
IEC 69/858/CD*CEI 69/858/CD*IEC/TS 61851- 27*CEI/TS 61851-27	Electric vehicle conductive charging system - Part 27: EV supply equipment with automated connection of a vehicle coupler according to IEC 62196-2 or IEC 62196-3
IEC 69/859/CD*CEI 69/859/CD*IEC/TS 61851- 26*CEI/TS 61851-26	Electric vehicle conductive charging system - Part 26: EV supply equipment with automated connection of a vehicle coupler located at the underbody of an electric vehicle
IEC 69/864/CDV*CEI 69/864/CDV*IEC 15118-2*CEI 15118-2*ISO 15118-2	Road vehicles - Vehicle-to-Grid Communication Interface - Part 2: Network and application protocol requirements
IEC 69/872/CD*CEI 69/872/CD*IEC 63382-1*CEI 63382-1	Management of Distributed Energy Storage Systems based on Electrically Chargeable Vehicles (ECV-DESS) - Part 1: Definitions, Requirements and Use Cases
IEC 69/900/CD*CEI 69/900/CD*IEC 61851-1*CEI 61851-1	Electric vehicle conductive charging system - Part 1: General requirements

<b>IEC 61557-1*CEI 61557-1</b>	Electrical safety in low voltage distribution systems up to 1000 V a.c. and 1500 V d.c. - Equipment for testing, measuring or monitoring of protective measures - Part 1: General requirements
<b>IEC/TS 63383*CEI/TS 63383</b>	Cybersecurity aspects of devices used for power metering and monitoring, power quality monitoring, data collection and analysis
<b>IEC 9/2862/CD*CEI 9/2862/CD*IEC 61373*CEI 61373</b>	Railway applications - Rolling stock equipment - Shock and vibration tests
<b>IEC 60913*CEI 60913</b>	Railway applications - Fixed installations - Electric traction overhead contact lines
<b>DIN EN ISO/IEC 23053</b>	Framework for Artificial Intelligence (AI) Systems Using Machine Learning (ML) (ISO/IEC 23053:2022); German and English version prEN ISO/IEC 23053:2023
<b>DIN EN 17926</b>	Privacy Information Management System per ISO/IEC 27701 - Refinements in European context; German and English version prEN 17926:2022
<b>DIN EN ISO/IEC 27001</b>	Information security, cybersecurity and privacy protection - Information security management systems - Requirements (ISO/IEC 27001:2022); German and English version prEN ISO/IEC 27001:2023
<b>ISO/IEC 30118-1</b>	Information technology - Open Connectivity Foundation (OCF) Specification - Part 1: Core specification
<b>ISO/IEC 30118-10</b>	Information technology - Open Connectivity Foundation (OCF) Specification - Part 10: Cloud API for cloud services specification
<b>ISO/IEC 30118-11</b>	Information technology - Open Connectivity Foundation (OCF) Specification - Part 11: Device to cloud services specification
<b>ISO/IEC 30118-12</b>	Information technology - Open Connectivity Foundation (OCF) Specification - Part 12: Cloud security specification
<b>ISO/IEC 30118-2</b>	Information technology - Open Connectivity Foundation (OCF) Specification - Part 2: Security specification
<b>ISO/IEC 30118-3</b>	Information technology - Open Connectivity Foundation (OCF) Specification - Part 3: Bridging specification
<b>ISO/IEC 30118-4</b>	Information technology - Open Connectivity Foundation (OCF) Specification - Part 4: Resource type specification
<b>ISO/IEC 30118-6</b>	Information technology - Open Connectivity Foundation (OCF) Specification - Part 6: Resource to AllJoyn interface mapping specification
<b>ISO/IEC 30118-7</b>	Information Technology - Open Connectivity Foundation (OCF) Specification - Part 7: Wi-Fi easy setup specification
<b>ISO/IEC 30118-9</b>	Information technology - Open Connectivity Foundation (OCF) Specification - Part 9: Core optional specification
<b>ISO/IEC DIS 4879</b>	Information technology - Quantum computing - Terminology and vocabulary
<b>ISO/IEC 15408-4</b>	Information security, cybersecurity and privacy protection - Evaluation criteria for IT security - Part 4: Framework for the specification of evaluation methods and activities
<b>ISO/IEC 15408-5</b>	Information security, cybersecurity and privacy protection - Evaluation criteria for IT security - Part 5: Pre-defined packages of security requirements
<b>ISO/IEC 27005</b>	Information security, cybersecurity and privacy protection - Guidance on managing information security risks
<b>ISO/IEC 27014</b>	Information security, cybersecurity and privacy protection - Governance of information security
<b>ISO/IEC TS 27100</b>	Information technology - Cybersecurity - Overview and concepts
<b>ISO/IEC TR 27103</b>	Information technology - Security techniques - Cybersecurity and ISO and IEC Standards
<b>ISO/IEC TS 27110</b>	Information technology, cybersecurity and privacy protection - Cybersecurity framework development guidelines
<b>ISO/IEC 27400</b>	Cybersecurity - IoT security and privacy - Guidelines
<b>ISO/IEC 27557</b>	Information security, cybersecurity and privacy protection - Application of ISO 31000:2018 for organizational privacy risk management
<b>ISO/IEC TR 30132-1</b>	Information technology - Information technology sustainability - Energy efficient computing models - Part 1: Guidelines for energy effectiveness evaluation
<b>ISO/IEC TR 30164</b>	Internet of things (IoT) - Edge computing
<b>ISO/IEC 23894</b>	Information technology - Artificial intelligence - Guidance on risk management
<b>ISO/IEC TR 24368</b>	Information technology - Artificial intelligence - Overview of ethical and societal concerns
<b>ISO/IEC 25059</b>	Software engineering - Systems and software Quality Requirements and Evaluation (SQuARE) - Quality model for AI systems

ISO/IEC/IEEE 8802-1AB	Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 1AB: Station and media access control connectivity discovery
ISO/IEC/IEEE 8802-1AB FDAM 1	Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 1AB: Station and media access control connectivity discovery - Amendment 1: YANG data model
ISO/IEC/IEEE 8802-1AB FDAM 2	Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 1AB: Station and media access control connectivity discovery - Amendment 2: Support for multiframe protocol data units
ISO/IEC TR 29119-11	Software and systems engineering - Software testing - Part 11: Guidelines on the testing of AI-based systems
ISO 10326-2	Mechanical vibration - Laboratory method for evaluating vehicle seat vibration - Part 2: Application to railway vehicles
ISO 21087	Gas analysis - Analytical methods for hydrogen fuel - Proton exchange membrane (PEM) fuel cell applications for road vehicles
ISO 13984	Liquid hydrogen - Land vehicle fuelling system interface
ISO 13985	Liquid hydrogen - Land vehicle fuel tanks
ISO 14687	Hydrogen fuel quality - Product specification
ISO 16110-1	Hydrogen generators using fuel processing technologies - Part 1: Safety
ISO 16110-2	Hydrogen generators using fuel processing technologies - Part 2: Test methods for performance
ISO 16111	Transportable gas storage devices - Hydrogen absorbed in reversible metal hydride
ISO 19880-1	Gaseous hydrogen - Fuelling stations - Part 1: General requirements
ISO/DIS 19880-2	Gaseous hydrogen - Fuelling stations - Part 2: Dispensers and dispensing systems
ISO 19880-3	Gaseous hydrogen - Fuelling stations - Part 3: Valves
ISO 19880-5	Gaseous hydrogen - Fuelling stations - Part 5: Dispenser hoses and hose assemblies
ISO 19880-8	Gaseous hydrogen - Fuelling stations - Part 8: Fuel quality control
ISO 19880-8 AMD 1	Gaseous hydrogen - Fuelling stations - Part 8: Fuel quality control - Amendment 1: Alignment with Grade D of ISO 14687
ISO 19881	Gaseous hydrogen - Land vehicle fuel containers
ISO 19882	Gaseous hydrogen - Thermally activated pressure relief devices for compressed hydrogen vehicle fuel containers
ISO/DIS 19885-1	Gaseous hydrogen - Fuelling protocols for hydrogen-fuelled vehicles - Part 1: Design and development process for fuelling protocols
ISO 22734	Hydrogen generators using water electrolysis - Industrial, commercial, and residential applications
ISO/TR 15916	Basic considerations for the safety of hydrogen systems
ISO/TS 19883	Safety of pressure swing adsorption systems for hydrogen separation and purification
ISO 21734-1	Intelligent transport systems - Performance testing for connectivity and safety functions of automated driving buses in public transport - Part 1: General framework
ISO 4426	Intelligent transport systems - Lower layer protocols for usage in the European digital tachograph
ISO 23795-1	Intelligent transport systems - Extracting trip data using nomadic and mobile devices for estimating CO <sub>2</sub> emissions - Part 1: Fuel consumption determination for fleet management
ISO/DIS 23795-2	Intelligent transport systems (ITS) - Extracting trip data using nomadic and mobile devices for estimating CO <sub>2</sub> emissions - Part 2: Information provision for eco-friendly driving behaviour
ISO 14067	Greenhouse gases - Carbon footprint of products - Requirements and guidelines for quantification
ISO 11519-3	Road vehicles - Low-speed serial data communication - Part 3: Vehicle area network (VAN)
ISO 15031-7	Road vehicles - Communication between vehicle and external equipment for emissions-related diagnostics - Part 7: Data link security
ISO 15118-9	Road vehicles - Vehicle to grid communication interface - Part 9: Physical and data link layer conformance test for wireless communication

ISO 17215-3	Road vehicles - Video communication interface for cameras (VCIC) - Part 3: Camera message dictionary
ISO 17215-4	Road vehicles - Video communication interface for cameras (VCIC) - Part 4: Implementation of communication requirements
ISO 17356-5	Road vehicles - Open interface for embedded automotive applications - Part 5: OSEK/VDX Network Management (NM)
ISO 17987-4	Road vehicles - Local Interconnect Network (LIN) - Part 4: Electrical physical layer (EPL) specification 12 V/24 V
ISO 17987-7	Road vehicles - Local Interconnect Network (LIN) - Part 7: Electrical Physical Layer (EPL) conformance test specification
ISO 17987-8	Road vehicles - Local Interconnect Network (LIN) - Part 8: Electrical physical layer (EPL) specification: LIN over DC powerline (DC-LIN)
ISO 20078-1	Road vehicles - Extended vehicle (ExVe) web services - Part 1: Content and definitions
ISO 20078-2	Road vehicles - Extended vehicle (ExVe) web services - Part 2: Access
ISO 20078-3	Road vehicles - Extended vehicle (ExVe) web services - Part 3: Security
ISO/TR 20078-4	Road vehicles - Extended vehicle (ExVe) web services - Part 4: Control
ISO 20794-4	Road vehicles - Clock extension peripheral interface (CXPI) - Part 4: Data link layer and physical layer
ISO 20794-5	Road vehicles - Clock extension peripheral interface (CXPI) - Part 5: Application layer conformance test plan
ISO 20794-6	Road vehicles - Clock extension peripheral interface (CXPI) - Part 6: Transport and network layer conformance test plan
ISO 20794-7	Road vehicles - Clock extension peripheral interface (CXPI) - Part 7: Data link and physical layer conformance test plan
ISO 21111-10	Road vehicles - In-vehicle Ethernet - Part 10: Transport layer and network layer conformance test plans
ISO 21111-2	Road vehicles - In-vehicle Ethernet - Part 2: Common physical entity requirements
ISO 21111-3	Road vehicles - In-vehicle Ethernet - Part 3: Optical 1-Gbit/s physical entity requirements and conformance test plan
ISO 21111-5	Road vehicles - In-vehicle Ethernet - Part 5: Optical 1-Gbit/s physical layer system requirements and test plans
ISO 21111-6	Road vehicles - In-vehicle Ethernet - Part 6: Electrical 100-Mbit/s physical entity requirements and conformance test plan
ISO 21308-3	Road vehicles - Product data exchange between chassis and bodywork manufacturers (BEP) - Part 3: General, mass and administrative exchange parameters
ISO/SAE 21434	Road vehicles - Cybersecurity engineering
ISO/TR 23786	Road vehicles - Solutions for remote access to vehicle - Criteria for risk assessment
ISO/TR 23791	Road vehicles - Extended vehicle (ExVe) web services - Result of the risk assessment on ISO 20078 series
ISO 26021-3	Road vehicles - End-of-life activation of in-vehicle pyrotechnic devices - Part 3: Data definitions
ISO/TR 4804	Road vehicles - Safety and cybersecurity for automated driving systems - Design, verification and validation
ISO/PAS 5112	Road vehicles - Guidelines for auditing cybersecurity engineering
ISO 1185	Road vehicles - Connectors for the electrical connection of towing and towed vehicles - 7-pole connector type 24 N (normal) for vehicles with 24 V nominal supply voltage
ISO 12098	Road vehicles - Connectors for the electrical connection of towing and towed vehicles - 15-pole connector for vehicles with 24 V nominal supply voltage
ISO 12405-4	Electrically propelled road vehicles --Test specification for lithium-ion traction battery packs and systems - Part 4: Performance testing
ISO 3553-2	Road vehicles - High-tension connectors for ignition coils and distributors - Part 2: Plug-types
ISO 3731	Road vehicles - Connectors for the electrical connection of towing and towed vehicles - 7-pole connector type 24 S (supplementary) for vehicles with 24 V nominal supply voltage
ISO/DIS 5474-1	Electrically propelled road vehicles - Functional requirements and safety requirements for power transfer - Part 1: General requirements for conductive power transfer

ISO/DIS 5474-2	Electrically propelled road vehicles - Functional requirements and safety requirements for power transfer - Part 2: AC power transfer
ISO/DIS 5474-3	Electrically propelled road vehicles - Functional requirements and safety requirements for power transfer - Part 3: DC power transfer
ISO/DTS 5474-5	Electrically propelled road vehicles - Functional requirements and safety requirements for power transfer - Part 5: Automated conductive power transfer
ISO 6856	Road vehicles - Unscreened high-voltage ignition cable assemblies - Test methods and general requirements
ISO 7638-2	Road vehicles - Connectors for the electrical connection of towing and towed vehicles - Part 2: Connectors for braking systems and running gear of vehicles with 12 V nominal supply voltage
ISO/TR 11954	Fuel cell road vehicles - Maximum speed measurement
ISO 12619-1	Road vehicles - Compressed gaseous hydrogen (CGH <sub>2</sub> ) and hydrogen/natural gas blend fuel system components - Part 1: General requirements and definitions
ISO 12619-10	Road vehicles - Compressed gaseous hydrogen (CGH <sub>2</sub> ) and hydrogen/natural gas blends fuel system components - Part 10: Pressure relief device (PRD)
ISO 12619-11	Road vehicles - Compressed gaseous hydrogen (CGH <sub>2</sub> ) and hydrogen/natural gas blends fuel system components - Part 11: Excess flow valve
ISO 12619-12	Road vehicles - Compressed gaseous hydrogen (CGH <sub>2</sub> ) and hydrogen/natural gas blends fuel system components - Part 12: Gas-tight housing and ventilation hoses
ISO 12619-13	Road vehicles - Compressed gaseous hydrogen (CGH <sub>2</sub> ) and hydrogen/natural gas blends fuel system components - Part 13: Rigid fuel line in stainless steel
ISO 12619-14	Road vehicles - Compressed gaseous hydrogen (CGH <sub>2</sub> ) and hydrogen/natural gas blends fuel system components - Part 14: Flexible fuel line
ISO 12619-15	Road vehicles - Compressed gaseous hydrogen (CGH <sub>2</sub> ) and hydrogen/natural gas blends fuel system components - Part 15: Filter
ISO 12619-16	Road vehicles - Compressed gaseous hydrogen (CGH <sub>2</sub> ) and hydrogen/natural gas blends fuel system components - Part 16: Fittings
ISO 12619-2	Road vehicles - Compressed gaseous hydrogen (CGH <sub>2</sub> ) and hydrogen/natural gas blend fuel system components - Part 2: Performance and general test methods
ISO 12619-2 AMD 1	Road vehicles - Compressed gaseous hydrogen (CGH <sub>2</sub> ) and hydrogen/natural gas blend fuel system components - Part 2: Performance and general test methods; Amendment 1
ISO 12619-3	Road vehicles - Compressed gaseous hydrogen (CGH <sub>2</sub> ) and hydrogen/natural gas blend fuel system components - Part 3: Pressure regulator
ISO 12619-3 AMD 1	Road vehicles - Compressed gaseous hydrogen (CGH <sub>2</sub> ) and hydrogen/natural gas blend fuel system components - Part 3: Pressure regulator; Amendment 1
ISO 12619-4	Road vehicles - Compressed gaseous hydrogen (CGH <sub>2</sub> ) and hydrogen/natural gas blends fuel system components - Part 4: Check valve
ISO 12619-5	Road vehicles - Compressed gaseous hydrogen (CGH <sub>2</sub> ) and hydrogen/natural gas blends fuel system components - Part 5: Manual cylinder valve
ISO 12619-6	Road vehicles - Compressed gaseous hydrogen (CGH <sub>2</sub> ) and hydrogen/natural gas blend fuel system components - Part 6: Automatic valve
ISO 12619-7	Road vehicles - Compressed gaseous hydrogen (CGH <sub>2</sub> ) and hydrogen/natural gas blends fuel system components - Part 7: Gas injector
ISO 12619-8	Road vehicles - Compressed gaseous hydrogen (CGH <sub>2</sub> ) and hydrogen/natural gas blends fuel system components - Part 8: Pressure indicator
ISO 12619-9	Road vehicles - Compressed gaseous hydrogen (CGH <sub>2</sub> ) and hydrogen/natural gas blends fuel system components - Part 9: Pressure relief valve (PRV)
ISO 21266-2	Road vehicles - Compressed gaseous hydrogen (CGH <sub>2</sub> ) and hydrogen/natural gas blends fuel systems - Part 2: Test methods
ISO 23273	Fuel cell road vehicles - Safety specifications - Protection against hydrogen hazards for vehicles fuelled with compressed hydrogen
ISO 23828	Fuel cell road vehicles - Energy consumption measurement - Vehicles fuelled with compressed hydrogen
ISO 20653	Road vehicles - Degrees of protection (IP code) - Protection of electrical equipment against foreign objects, water and access
ISO 21266-1	Road vehicles - Compressed gaseous hydrogen (CGH <sub>2</sub> ) and hydrogen/natural gas blends fuel systems - Part 1: Safety requirements
ISO 21448	Road vehicles - Safety of the intended functionality
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ISO 8820-11	Road vehicles - Fuse-links - Part 11: Fuse-links with tabs (blade type) Type M (medium-high current)
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ISO 16234	Heavy commercial vehicles and buses - Straight-ahead braking on surfaces with split coefficient of friction - Open-loop test method
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ISO 16254	Acoustics - Measurement of sound emitted by road vehicles of category M and N at standstill and low speed operation - Engineering method
ISO 362-1	Acoustics - Engineering method for measurement of noise emitted by accelerating road vehicles - Part 1: M and N categories
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UNECE 51/REV 3/AMD 5*UNECE 51/AMD 5	Noise of M and N categories of vehicles
UNECE 134	Uniform provisions concerning the approval of motor vehicles and their components with regard to the safety-related performance of hydrogenfuelled vehicles (HFCV)
UNECE 134/AMD 1	Uniform provisions concerning the approval of motor vehicles and their components with regard to the safety-related performance of Hydrogen-Fuelled Vehicles (HFCV)



<b>UNECE 134/AMD 2</b>	Uniform provisions concerning the approval of motor vehicles and their components with regard to the safety-related performance of hydrogen fuelled vehicles (HFCV)
<b>UNECE 134/AMD 3</b>	Uniform provisions concerning the approval of motor vehicles and their components with regard to the safety-related performance of hydrogen fuelled vehicles (HFCV)
<b>UNECE 134/AMD 4</b>	Uniform provisions concerning the approval of motor vehicles and their components with regard to the safety-related performance of Hydrogen-Fuelled Vehicles (HFCV)
<b>UNECE 134/AMD 5</b>	Uniform provisions concerning the approval of motor vehicles and their components with regard to the safety-related performance of Hydrogen-Fuelled Vehicles (HFCV)
<b>UNECE 146</b>	Uniform provisions concerning the approval of motor vehicles and their components with regard to the safety-related performance of hydrogen-fuelled vehicles of categories L1, L2, L3, L4 and L5
<b>UNECE 134/REV 1/AMD 1*UNECE 134/AMD 1</b>	Uniform provisions concerning the approval of motor vehicles and their components with regard to the safety-related performance of Hydrogen-Fuelled Vehicles (HFCV)
<b>VDI 4682</b>	Fuel cell heating appliances - Drafting of service contracts
<b>VDI 4463</b>	Battery controlling in fleet management
<b>VDA 900-100</b>	Guidance for Conducting Life Cycle Assessment Studies of Passenger Cars
<b>VDMA 40400-1</b>	OPC UA for Powertrain - Part 1: Asset Management
<b>VDV 463</b>	Real data interface charging management - Intermodal Transport Control System (ITCS) and Depot Management System (DMS)
<b>VGB-S-165-00</b>	Recommendations for the improvement of H2 safety at hydrogen-cooled generators

